GASTROENTEROLOGY

ABSTRACTS AND CITATIONS

NATIONAL INSTITUTE OF ARTHRITIS, METABOLISM, AND DIGESTIVE DISEASES

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

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The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1981.

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LANGUAGE ABBREVIATIONS

Afrikaans	Afr.	Georgian	Geo.	Persian	Per.
Albanian	Alb.	German	Ger.	Polish	Pol.
Arabic	Ara.	Greek	Gre.	Portuguese	Por.
Armenian	Arm.	Hausa	Hau.	Pushto	Pus.
Azerbaijani	Aze.	Hebrew	Heb.	Rumanian	Rum.
Belorussian	Bel.	Hindi	Hin.	Russian	Rus.
Bengali	Ben.	Hungarian	Hun.	Serbian	Ser.
Bulgarian	Bul.	Icelandic	Ice.	Slovak	Slo.
Burmese	Bur.	Indonesian	Ind.	Slovene	Slv.
Chinese	Chi.	Interlingua	Int.	Spanish	Spa.
Croatian	Cro.	Italian	Ita.	Swahili	Swa.
Czechoslovakian	Cze.	Japanese	Jpn.	Swedish	Swe.
Danish	Dan.	Kirghiz	Kir.	Tagalog	Tag.
Dutch	Dut.	Korean	Kor.	Tamil	Tam.
English	Eng.	Latin	Lat.	Telugu	Tel.
Esperanto	Esp.	Latvian	Lav.	Thai	Tha.
Estonian	Est.	Lithuanian	Lit.	Turkish	Tur.
Finnish	Fin.	Marathi	Mar.	Ukranian	Ukr.
Flemish	Fle.	Masai	Mas.	Urdu	Urd.
French	Fre.	Multilingual	Mlt.	Vietnamese	Vie.
Gaelic	Gae.	Norwegian	Nor.	Welsh	Wel.

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	ml, µl	milli-, microliter(s)
ADP	adenosine diphosphate	mm	millimeter(s)
AMP	adenosine monophosphate	mOsm	milliosmolar; milliosmeter(s)
amp	ampere	msec	millisecond(s)
ATP	adenosine triphosphate	mV	millivolt(s)
A	angstrom	min	minute(s)
BSP	sulfobromophthalein	MTD	maximum tolerated dose
C	degrees centigrade	NAD	nicotinamide adenine dinucleotide
cal	calories	NADH	reduced nicotinamide adenine dinucleotide
cc	cubic centimeter	NADP	nicotinamide adenine dinucleotidephosphate
cm	centimeter(s)	NADPH	reduced nicotinamide adenine dinucleotidephosphate
dl	deciliter	ng	nanogram (10^{-9})
DNA	deoxyribonucleic acid	nm	nanometer(s)
ED_{50}	median effective dose(s)	Pa	ambient pressure
EDTA	ethylenediamine tetraacetic acid	PAS	periodic acid - Schiff
e.g.	for example	pg	picogram (10^{-12})
EEG	electroencephalogram	pgEq	picogram equivalent(s)
ESR	erythrocyte sedimentation rate	p.o.	orally
g	gram(s)	ppb	parts per billion
µg	microgram(s)	ppm	parts per million
Hz	Hertz	r	Roentgen
hr	hour(s)	RBC	red blood cells (erythrocytes), red blood count
Ig	immunoglobulin(s)	resp.	respectively
i.m.	intramuscular	RNA	ribonucleic acid
i.p.	intraperitoneal	s.c.	subcutaneous
IU	international unit(s)	sec	second(s)
i.v.	intravenous	SGOT	serum glutamic-oxalacetic transaminase
kcal	kilocalorie(s)	SGPT	serum glutamic-pyruvic transaminase
kg	kilogram(s)	U	unit(s)
K_m	Michaelis constant	UV	ultraviolet
LD_{50}	median lethal dose(s)	V	volt
LDH	lactic acid dehydrogenase	WBC	white blood cells (leukocytes), white blood count
m	meter(s)	yr	year(s)
M	molar; mole(s)		
mM	millimolar; millimole(s)		
µM	micromolar; micromole(s)		
ma	milliampere(s)		
mCi, µCi	milli-, microcurie(s)		
mEq	milliequivalent(s)		
mg	milligram(s)		

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

7271 EVIDENCE FOR ARTERIOVENOUS COMMUNICATIONS IN THE GASTROINTESTINAL TRACT. (Eng.) Leonard, J. J.; Emery, R. W.; Einzig, S.; Nicoloff, D. M.; Fox, I. J. (Univ. Minnesota Medical Sch., Minneapolis, MN). *Surg. Forum* 28:419-421; 1977.

A study was carried out in 17 mongrel dogs to determine whether arteriovenous communications (AVCs) less than 15 μm in size exist in the gastrointestinal tract and, if so, their effect on gastrointestinal blood flow measurement by a radionuclide-labeled microsphere technique. The anesthetized dogs were placed on positive-pressure ventilation, and 10^6 15-μm ^{85}Sn- and 7 x 10^6 8-μm ^{46}Sc-labeled microspheres were injected simultaneously into the left atrium via a catheter while a reference sample was withdrawn from the aorta at a constant rate. After sacrifice, the gastrointestinal organs were excised at 2 min (group 1, 6 dogs), 15 min (group 2, 5 dogs), or 60 min (group 3, 6 dogs) following microsphere injection, and gastrointestinal blood flow measured by the aortic reference sample technique in 1.0- to 15-g organ samples. The mean aortic pressure, heart rate, pH, PO_2, and PCO_2 were similar in all three groups. Flow values for the 8-μm microspheres were 25-70% (average 48%) lower than values for the 15-μm microspheres for all gastrointestinal organs except the spleen and pancreas, indicating the early traversal of the smaller microspheres across the microcirculation in all but those two organs, with lodgment of these microspheres in the liver. The flow rate of 8-μm microspheres was much higher than that of 15-μm microspheres in the liver (58 versus 21 ml/min/100 g), indicating traversal across the mesenteric microcirculation by the 8-μm microspheres. The results indicate the presence of AVCs <15 μm in size in gastrointestinal organs other than the pancreas and spleen, regardless of whether these are normal capillaries or arteriovenous anastomoses.

7272 LUMINAL DILATATION AND MORPHOLOGIC CHANGES SECONDARY TO ENTEROTOXINS. (Eng.) Udall, J. N.; Alvarez, L. A.; Peterson, D. F.; Nichols, B. L. (Dept. Pediatrics, Univ. Arizona, Tucson, AZ 85724). *Physiol. Chem. Phys.* 9(2):109-116; 1977.

The validity of interpreting mucosal changes in closed intestinal loop models in the presence of severe distention was tested by studying structural changes in ligated rat small intestinal loops exposed to purified cholera enterotoxin. Exposure of ligated loops to 20 μg of cholera enterotoxin increased the fluid content from a control level of 0.05 ± 0.03 ml to 1.86 ± 0.56 ml ($p<0.001$). These enterotoxin-exposed loops were microscopically abnormal, many having severe shortening of the villi. In another series of experiments, temporarily ligated intestinal loops were exposed to cholera enterotoxin, the ligature was removed after 15 min, and the abdominal wall sutured. The animal was sacrificed after 5-6 hr, and a large-bore needle and syringe were used to aspirate open loop luminal fluid from each animal. The average volume of luminal fluid from the controls in the open loop system was 0.3 ± 0.2 ml, whereas that in the enterotoxin-exposed animals was 1.3 ± 0.3 ml ($p<0.005$). The morphology of enterotoxin-exposed loops and control loops were normal. These studies show that distention secondary to increased luminal fluid causes artifactual histologic damage, which questions the validity of interpreting mucosal changes in closed intestinal loop models in the presence of severe distention. The open loop model described eliminates distention as a cause of histologic changes.

7273 THE ULTRASTRUCTURE OF RAT INTESTINAL EPITHELIUM AS REVEALED BY CRYOULTRAMICROTOMY AND TRANSMISSION ELECTRON MICROSCOPY. (Eng.) Johnson, I. T.; Bronk, J. R. (Dept. Biology, Univ. York, Heslington, York YO1 5DD, England). *Micron* 8(3):139-143; 1977.

Rat jejunal mucosa, rapidly frozen without the use of cryoprotectants, was sectioned by cryoultramicrotomy and examined by transmission electron microscopy to determine whether this technique is suitable for the study of intestinal transport. The quality of the sections varied with their morphological origin, but acceptable preservation of ultrastructure was obtained near the extremities of the villi. The "ripple" artifact was visible in some sections, and in other sections, the "knitting" artifact, thought to be due to ice-crystal formation, was seen. The brush borders were not disrupted, but they did not exhibit the very ordered appearance with clearly defined microvilli seen in conventionally prepared material. In many areas, the microvilli appeared to be fused into an amorphous layer, and only where some separation occurred was it possible to distinguish them individually. This appeared to be due to the presence of a substantial mucous coat. It is concluded that this procedure is satisfactory as long as the grids are not exposed to the atmosphere for more than a few minutes, which results in artifacts.

7274 A RECONSIDERATION OF THE ISCHIORECTAL FOSSA. (Eng.) Hammer, R. P., Jr.; Shrewsbury, M. M. (Univ. California, Center Health Sciences, Los Angeles, CA). *Dis. Colon Rectum* 20(8):681-689; 1977.

7275 ELECTRON MICROSCOPIC STUDIES OF EXPERIMENTAL Entamoeba histolytica INFECTION IN THE GUINEA PIG. III. HISTOLYSIS OF THE CECUM. (Eng.) Takeuchi, A.; Jervis, H. R.; Phillips, B.

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

P. (Walter Reed Army Inst. Res., Washington, DC 20012). *Virchows Arch. [Cell Pathol.]* 24(4):263-277; 1977.

7276 DIFFERENT PARTICLE TYPES IN TISSUE CULTURE AND INTESTINAL EPITHELIUM INFECTED WITH ROTAVIRUS. (Eng.) Chasey, D. (Central Veterinary Lab., New Haw, Weybridge, Surrey KT15 3NB, England). *J. Gen. Virol.* 37(3):443-451; 1977.

7277 ISOLATION AND CHARACTERIZATION OF A LIVER-SPECIFIC ANTIGEN (F-Ag) FROM HUMAN LIVER. (Eng.) Mihas, A. A.; Saccomani, G.; Tomana, M.; Spenney, J. G. (Div. Gastroenterology, Univ. Alabama in Birmingham, Birmingham, AL 35294). *Immunochemistry* 14(11/12):727-731; 1977.

7278 EPITHELIAL MITOTIC ACTIVITY IN EXPERIMENTAL GASTRIC WOUNDS. (Eng.) Adair, H. M. (Royal Coll. Surgeons of England, London WC2A 3PN, England). *J. Anat.* 125(2):401-407; 1978.

7279 LIVER VOLUME DETERMINATION BY ULTRASONIC SCANNING. (Eng.) Rasmussen, S. N. (Herlev Hosp., 2730 Herlev, Copenhagen, Denmark). *Dan. Med. Bull.* 25(1):1-45; 1978.

7280 FUNCTIONAL ANATOMY OF THE PORTAL VEIN AND ITS MAIN AND SEGMENTAL BRANCHES IN THE ADULT MAN. (Eng.) Ferraz de Carvalho, C. A.; Junqueira Rodrigues, C. (Departamento de Anatomia, Universidade de Sao Paulo, Av. Dr. Arnaldo 455, Cx. Postal 2921, Sao Paulo, Brazil). *Anat. Anz.* 143(1):50-71; 1978.

See also, 7285, 7308, 7310, 7346, 7352, 7353, 7356, 7387, 7438, 7449, 7463, 7495, 7850, 7933, 7936.

ABSORPTION - EXCRETION - TRANSPORT

7281 ELECTRICAL PACING INCREASES JEJUNAL ABSORPTION OF WATER, GLUCOSE, AND SODIUM. (Eng.) Collin, J.; Kelly, K. A.; Phillips, S. F. (Mayo Foundation, Rochester, MN). *Surg. Forum* 28:428-430; 1977.

To determine whether absorption from a segment of small bowel could be increased by backward electrical pacing, a 75-cm segment of proximal jejunum was isolated in each of three mongrel dogs, and the two ends of the segment were fashioned as separate stomas on the anterior abdominal wall. After recovery, each conscious fasted dog was tested on six separate occasions. The test consisted of a 50-g liver meal to induce a fed pattern of intestinal electrical activity, continuous infusion (2.9 ml/min) into the proximal stoma of a glucose (100 mM) plus NaCl (90 mEq/l) solution, and three 30-min periods of measurement in each of which the transit time of a 1-ml bolus of ^{14}C-polyethylene glycol through the loop was determined and in the second of which the segment was driven backward electrically. The electrical stimuli always produced entrainment and backward propagation of pacesetter potentials at the stimulated frequency (16.2/min). The mean time required for transit of 20% of the bolus was significantly longer ($p<0.05$) during pacing than it was either before or after. In each dog, the output of water and the total amount of glucose and sodium collected from the distal stoma were significantly less during pacing than they were either before or after pacing ($p<0.001$-0.02). Backward electrical pacing slows transit time through and increases absorption of water, glucose, and sodium from the isolated canine jejunal segment. This finding may have therapeutic applications in patients with the short bowel syndrome.

7282 CONTRIBUTION OF DIFFUSIVE PATHWAY IN INTESTINAL ABSORPTION OF GLUCOSE IN RAT UNDER NORMAL FEEDING CONDITION. (Eng.) Murakami, E.; Saito, M.; Suda, M. (Sch. Medicine, Ehime Univ., Shigenobu, Onsen-gun, Ehime 791-02, Japan). *Experientia* 33(11):1469-1470; 1977.

The contribution of passive transport in glucose absorption was studied in male Wistar rats by investigating the relationship between the luminal glucose concentration and the absorption rate of glucose. The small intestinal glucose concentration, determined by a specific enzymatic method, was less than 2 mM before feeding and reached a maximum level of 50 mM after feeding a normal meal (laboratory chow). Glucose absorption was studied *in vivo* by circulating various concentrations of glucose through the lumen of the upper half of the small intestine for 15 min. The contribution of passive absorption was studied by eliminating phlorizin-sensitive active transport by the addition of 0.5 mM phlorizin to the glucose solution. The rate of glucose absorption in the presence of phlorizin increased proportionately with an increase in luminal glucose concentration. The difference between the rates in the absence and pre-

sence of phlorizin was saturable, and the half-maximal concentration of glucose was about 10 mM. The rate of phlorizin-sensitive absorption was greater than that of the phlorizin-insensitive absorption up to a glucose concentration of approximately 35 mM, but above this concentration, the opposite was true. These results suggest that glucose is absorbed mainly via the active transport system when the luminal concentration is low, but that a larger fraction of glucose is absorbed by a passive process when the luminal glucose concentration is high.

7283 INTESTINAL ABSORPTION OF GLUCOSE FROM ISOLATED MICE JEJUNAL LOOPS IN VIVO: EFFECT OF DIFFERENT DERIVATIVES OF TETRACYCLINES. (Eng.) DuHa, S.; Basu, P. S.; Banerjee, S. (Dey's Medical Stores [Manufacturing] Ltd., Calcutta 700 019, India). *Indian J. Exp. Biol.* 15(6):452-454; 1977.

The effect of different derivatives of tetracyclines on the intestinal absorption of glucose was studied using isolated mice jejunal loops *in vivo* and everted mice jejunal sacs *in vitro*. Absorption of glucose (3 mg) from 1 ml of buffer with or without the different tetracyclines (250 µg) by jejunal loops containing six mesenteric blood vessels was measured *in vivo* in control mice and in mice treated previously for 7 days with daily i.v. injections of 25 mg/kg of tetracycline hydrochloride (TH), oxytetracycline hydrochloride (OTH), chlortetracycline hydrochloride (CTH), or demethylchlortetracycline hydrochloride (DTH); the same drug was used in both the pretreatment and the test on any one mouse. In the control mice, glucose absorption in the absence of any drug was 19 ± 1.7 mg/g dry intestine/hr, and this level was reduced to 10 ± 1.5, 9 ± 1.9, 8 ± 1.6, and 11 ± 2 mg/g dry intestine/hr by the presence of TH, OTH, CTH, and DTH, resp., in the buffer. In mice pretreated with a drug, the glucose absorption (in mg/g dry intestine/hr) in the presence of the same drug was 12 ± 1.4, 11 ± 2, 12 ± 1.4, and 13 ± 2.5 for TH, DTH, CTH, and DTH, resp. The Na^+K^+-ATPase activity of the intestinal mucosa (in µg inorganic phosphate [Pi] liberated/mg protein/15 min) was 13.3 ± 2.0, 3.5 ± 0.5, 6.1 ± 0.44, 1.7 ± 0.28, and 3.0 ± 0.17 for controls and TH, OTH-, CTH-, and DTH-treated mice, resp. In everted jejunal sacs *in vitro* filled with glucose (3 mg) in 0.3 ml buffer, the mean transferance of glucose/g dry intestine/hr from the mucosal to the serosal surface was 34 ± 2, and the Na^+K^+-ATPase activity (as µg Pi liberated/mg protein/15 min) was 13.3 ± 0.64; when TH (250 µg/ml) was added to the glucose solution, the mean transferance was reduced to 21 ± 1.5 ($p<0.005$) and the ATPase activity to 6.3 ± 0.82 ($p<0.005$). The diminished transport of glucose by mouse jejunum after treatment with different tetracyclines appears to be due to an insufficient energy supply as a result of diminished ATPase activity.

7284 EFFECT OF DIETARY CARBOHYDRATES ON INTESTINAL TRANSPORT AND ACCUMULATION OF $^{59}Fe^{++}$ IN IRON DEFICIENT RATS. (Eng.) Chang, Y. O.; Varnell, T. R. (Div. Biochemistry, Univ. Wyoming, Laramie, WY 82071). *Int. J. Vitam. Nutr. Res.* 47(3):292-295; 1977.

Because *in vivo* studies have indicated that the type of dietary carbohydrate influences the intestinal absorption of iron, a study was carried out to investigate this influence on the active transport of $^{59}Fe^{2++}$ across the wall of isolated small intestinal tissue and the ability of the tissue to accumulate $^{59}Fe^{++}$. Six groups of six male Sprague-Dawley rats were fed 69% carbohydrate iron-deficient diets for 3 weeks. The carbohydrates were cornstarch, dextrin, glucose, fructose, sucrose, or a sucrose-lactose mixture, and measurements were carried out in everted duodenal sacs from sacrificed animals that had been fasted for 12 hr. Only the dextrin-fed rats maintained normal hematocrit values ($p<0.05$), and they exhibited the lowest transfer rate ($p<0.05$) and accumulation of iron ($p<0.05$) of all groups. The rats fed fructose also had significantly lower ($p<0.05$) transfer rates and accumulation of radioiron than did the remainder of the experimental groups. The fructose-fed rats had markedly thicker intestinal walls than did the other groups, which may explain the low transfer rate and absorption of radioiron by this group. The low transfer rate and absorption of iron by dextrin-fed rats is more likely due to altered osmotic relationships in the intestinal wall, producing a slower depletion of body iron reserves during the experimental period. Dietary carbohydrate appears to exert a definite effect on iron metabolism that needs to be further defined.

7285 MORPHOLOGICAL APPEARANCE OF FAT IN THE EPITHELIAL CELLS OF DIFFERENT PORTIONS OF THE INTESTINES IN MICE. (Eng.) Snipes, R. L. (Zentrum fur Anatomie und Cytobiologie, Justus-Liebig-Universitat, D-6300 Giessen, W. Germany). *Experientia* 33(10):1335-1336; 1977.

Fat absorption was studied morphologically in different segments of the mouse small and large intestines. Mice fasted for 2-3 days were force-fed massive doses of commercial triglycerides (vegetable oil, 0.10-0.15 ml/g) over 2-3 days by gastric intubation. Morphologically, fat appeared as small droplets concentrated in the supranuclear region, presumably in the Golgi region, in the epithelial cells of the most proximal portion of the small intestine. In addition, scattered, fine droplets occurred in the apical cell area. Distal to the duodenum (4-20 cm from the pyloric-duodenal junction), an abrupt increase in the content and size of fat droplets was noted. Fat distribution demonstrated a proximal to distal gradient, being greatest in the mid-jejunal area, but less in the duodenum and ileum. In the cecum and proximal colon, a limited number of fat droplets was observed. The authors stress that the criterion of the amount and size of fat droplets in intestinal epithelial cells does not necessarily give a reliable indication of the efficiency of fat absorption in the different intestinal segments.

7286 EFFECT OF VITAMIN D_3 ON DUODENAL ABSORPTIVE CELL PLASMA MEMBRANES: FREEZE FRACTURE REPLICATION STUDY. (Eng.) Jande, S. S. (Dept. Anatomy, Ottawa Univ., Ottawa, Canada). *Cytobios* 17(67/68):171-176; 1976.

Since previous studies have suggested that vitamin D produces alterations in the permeability of the plasma membrane and/or modifies the juxta-luminal complexes, chick duodenal absorptive cells were studied by a freeze-fracturing technique to investigate whether vitamin D also alters the plasma membrane. Immediately after hatching, the chicks were fed a vitamin D-deficient diet for 4 weeks. Some were given i.m. injections of 500 IU of vitamin D_3 24 hr prior to removal of the duodenum. In rachitic as well as vitamin D-replete chicks, the fracture faces of the microvillar as well as lateral and basal plasma membranes revealed the typical structures of plasma membranes described earlier. The PF (convex) faces had numerous, randomly scattered particles of about 8.5 nm in size, whereas the EF (concave) faces had fewer particles. The microvillar membranes had a higher number of particles than did the lateral and basal membranes. Although the number and distribution of particles on the PF faces in the three locations were similar in the two groups of animals, there was a higher number of particles on the EF faces of the membrane from vitamin D-replete chicks than from rachitic chicks. The number of particles were about 0.92 and 2.73 particles/100 nm^2 area in rachitic and vitamin D-replete chicks, resp. In addition, the zonula occludens in rachitic chicks demonstrated a complex arrangement of ridges and grooves, whereas the ridges were fewer in the vitamin D-replete chicks, and many of the ridges showed discontinuities. These changes appear to be related to increased active absorption and passive diffusion of calcium, resp., under the influence of vitamin D_3.

7287 ENHANCEMENT OF IRON ABSORPTION IN IRON DEPLETED RATS BY INCREASING DIETARY FAT. (Eng.) Bowering, J.; Masch, G. A.; Lewis, A. R. (Div. Nutritional Sciences, Cornell Univ., Ithaca, NY 14853). *J. Nutr.* 107(9):1687-1693; 1977.

7288 TRANSPORT OF SODIUM, WATER, 3-O-METHYL-GLUCOSE AND L-PHENYLALANINE IN VITRO IN BIOTIN-DEFICIENT RATS [sic] INTESTINE. (Eng.) Petrelli, F.; Coderoni, S.; Moretti, P.; Paparelli, M. (Inst. General Physiology, Univ. Camerino, Camerino, Italy). *Experientia* 33(9):1189-1190; 1977.

7289 IRON ABSORPTION FROM A CEREAL-BASED MEAL CONTAINING CANE SUGAR FORTIFIED WITH ASCORBIC ACID. (Eng.) Derman, D.; Sayers, M.; Lynch, S. R.; Charlton, R. W.; Bothwell, T. H.; Mayet, F. (South African Medical Res. Council Iron and Red Cell Metabolism Unit, Univ. Witwatersrand, Johannesburg, South Africa). *Br. J. Nutr.* 38(2): 261-269; 1977.

7290 SUPPRESSION OF TRANSDUODENAL MANGANESE TRANSPORT BY MILK DIET SUPPLEMENTED WITH IRON. (Eng.) Gruden, N. (Inst. Medical Res., M. Pijade 158, 41000 Zagreb, Yugoslavia). *Nutr. Metab.* 21(5):305-309; 1977.

7291 BIGUANIDES AND INTESTINAL ABSORPTIVE FUNCTION. (Eng.) Caspary, W. F. (Dept. Medicine, Univ. Gottingen, D-3400 Gottingen, W. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):473-480; 1977.

7292 THE EFFECT OF EXOGENOUS ATP ON INTESTINAL CALCIUM TRANSPORT. (Eng.) Wrobel, J.; Michalska, L. (Medical Sch., ul Debinki 1, 80-211 Gdansk, Poland). *Comp. Biochem. Physiol. [A]* 58(4): 421-425; 1977.

7293 MINIREVIEW: INTESTINAL ABSORPTION OF PARTICULATE MATTER. (Eng.) LeFevre, M. E.; Joel, D. D. (Medical Res. Center, Brookhaven Natl. Lab., Upton, NY 11973). *Life Sci.* 21(10): 1403-1408; 1977.

7294 STUDIES ON DRUG NONEQUIVALENCE: V. GASTROINTESTINAL ABSORPTION OF POLYMORPHS OF SULFAMETER. (Eng.) Kuroda, K.; Yokoyama, T.; Umeda, T. (Kobe Univ. Sch. Medicine, Kobe, Japan). *Kobe J. Med. Sci.* 22(4):255-261; 1976.

7295 CALCIUM TRANSPORT BY THE NORMAL RAT COLON IN VIVO AND IN VITRO. (Eng.) Urban, E.; Smith, N. L.; Smith, T. C. (Audie L. Murphy Veterans Admin. Hosp., 7400 Merton Minter Blvd., San Antonio, TX 78284). *Digestion* 17(1):69-83; 1978.

7296 INTESTINAL RESPONSE TO 1α,25-DIHYDROXY-CHOLECALCIFEROL: I. RNA POLYMERASE, ALKALINE PHOSPHATASE, CALCIUM AND PHOSPHORUS UPTAKE IN VITRO, AND IN VIVO CALCIUM TRANSPORT AND ACCUMULATION. (Eng.) Morrissey, R. L.; Zolock, D. T.; Bikle, D. D.; Empson, R. N., Jr.; Bucci, T. J. (Letterman Army Inst. Res., Presidio of San Francisco, CA 94129). *Biochim. Biophys. Acta* 538(1):23-33; 1978.

7297 DIGESTION AND ABSORPTION OF PROTEIN. (Eng.) Freeman, H. J.; Kim, Y. S. (Veterans Admin. Hosp., San Francisco, CA). *Annu. Rev. Med.* 29:99-116; 1978.

7298 INTESTINAL ABSORPTION OF FATS. (Eng.) Borgstrom, B. (Dept. Physiological Chemistry, Univ. Lund, Lund, Sweden). *Bibl. Nutr. Dieta* 25:1-6; 1977.

See also, 7345, 7444, 7446, 7447, 7472, 7621, 7878.

7299 THE EFFECT OF MOTILIN ON THE GASTROINTESTINAL PROPULSION IN RATS. (Eng.) Nakazawa, S.; Segawa, K.; Hidano, H.; Tsukamoto, Y.; Aichi, M.; Ichikawa, T. (Nagoya Univ. Sch. Medicine, Tsuruma-cho, Showa-ku, Nagoya, 466 Japan). *Gastroenterol. Jpn.* 13(1):50-53; 1978.

Gastric emptying and intestinal propulsion were determined simultaneously in unanesthetized rats by a ^{51}Cr method, and the effect of motilin on gastrointestinal propulsion was studied. Male Wistar rats received either physiological saline (0.5 ml, s.c.) or motilin (10, 100, 400, or 1,000 ng/kg, s.c.), followed 15 min later by ^{51}Cr-sodium chromate via a stomach catheter. Control rats were sacrificed at 15, 30, or 60 min and test rats at 30 min after ^{51}Cr-label administration. In the controls, the ^{51}Cr label was shown to move through the gastrointestinal tract with time. Intragastric radioactivity at 15, 30, and 60 min after dosing was 55.2 ± 13.8%, 37.3 ± 4.3%, and 15.0 ± 2.8%, resp., which illustrates that gastric emptying is linearly dependent upon time (semilogarithmic plot). Motilin at 10 or 100 ng/kg did not significantly affect gastric emptying, but the intragastric radioactivity was 24.8 ± 5.1% and 25.5 ± 1.6% at 400 and 1,000 ng/kg of motilin, resp., which represents a significant ($p<0.02$) acceleration of gastric emptying.

7300 SOME POSSIBILITIES FOR PROSTAGLANDIN MEDIATION IN THE CONTRACTILE RESPONSE TO ATP OF THE GUINEA-PIG DIGESTIVE TRACT. (Eng.) Kamikawa, Y.; Serizawa, K.; Shimo, Y. (Dokkyo Univ. Sch. Medicine, Mibu-machi, Tochigi 321-02, Japan). *Eur. J. Pharmacol.* 45(2):199-203; 1977.

To investigate the mechanism involved in the contractile responses of the digestive tract to ATP, the influence of the prostaglandin synthesis inhibitor, indomethacin, and of the prostaglandin antagonist, polyphloretin phosphate (PPP), were examined in various longitudinal muscles of the guinea pig digestive tract. ATP (10-300 μM) produced contractions in esophageal muscularis mucosae, duodenum, jejunum, and ileum and relaxations in the gastric body, tenia cecum, ascending colon, and rectum. In addition, "rebound" contractions appeared in the gastric body, tenia cecum, ascending colon, and rectum of all animals immediately after ATP had been washed out from the organ bath. Preincubation with 3-20 μM indomethacin for 30 min significantly inhibited esophageal and small intestinal contractions induced by ATP, whereas relaxation of the stomach, tenia cecum, colon, and rectum was increased. Rebound contractions of the latter preparations were also inhibited. The effective dose of indomethacin for significant modification differed among preparations (e.g., 3 μM in esophagus and stomach and 10 or 20 μM in intestine). The concentrations of indomethacin used in each preparation had no effect on the muscle tone of esophagus and small intestine, but decreased that of stomach, colon, and rectum by about 15% and that of tenia by about 20% of the maximal relaxation caused by an application of isoproterenol (1 μM). PPP (10-100 μg/ml), preincubated for 15 min, produced similar effects in all preparations. Responses of esophagus and stomach were more effectively modified by PPP than were those of intestine (10 or 30 μg/ml versus 50 or 100 μg/ml, resp.). PPP had no effect on esophageal or small intestinal muscle tone, but in the colon and rectum, the relaxation due to PPP was about 10% and in stomach about 25% of the maximal relaxation caused by an application of isoproterenol. The results suggest that prostaglandin release might contribute to the contractile responses of the guinea pig digestive tract to ATP.

7301 EFFECTS OF SOME DRUGS ON THE CIRCULAR MUSCLE OF THE ISOLATED LOWER OESOPHAGUS. (Eng.) Takayanagi, I.; Kasuya, Y. (Dept. Chemical Pharmacology, Univ. Tokyo, Tokyo 113, Japan). *J. Pharm. Pharmacol.* 29(9):559-560; 1977.

The effects of various drugs on the circular muscle of the lower esophagus and on the esophageal body isolated from the rat and on the lower esophagus isolated from the guinea pig were investigated. Acetylcholine chloride (Ach), cerulein (CE), tetragastrin (TG), and 5-hydroxytryptamine creatinine sulfate (5-HT) contracted the rat circular muscle of the lower esophagus dose-dependently. The dose response curves for CE, TG, and 5-HT were less steep than that for Ach, and the maximum responses relative to that of Ach were 25 ± 9% for CE, 13 ± 6% for TG, and 38 ± 14% for 5-HT. The response to Ach was abolished by atropine sulfate (10^{-7} g/ml), indicating that the site of action of Ach is a muscarinic receptor. An α-adrenoceptor stimulant, phenylephrine hydrochloride (PE, 10^{-7}-10^{-6} g/ml) relaxed the lower esophageal preparation, and the relaxation by PE was greatly reduced by the α-adrenoceptor blocker, tolazoline hydrochloride (10^{-5} g/ml) or phenoxybenzamine hydrochloride (10^{-7} g/ml) but not by a β-adrenoceptor blocker, propranolol hydrochloride (10^{-7} g/ml). The relaxation by a β-adrenoceptor stimulant, (-)-isoproterenol hydrochloride (3×10^{-8} to 10^{-6} g/ml) was abolished by propranolol (10^{-6} g/ml). PE, however, did contract the lower esophageal preparation, even in the presence of propranolol (10^{-6} g/ml). In the circular muscle of the rat esophageal body, Ach caused a dose-related rise in the basal tension of the preparation. TG and CE had no effect on basal tension. Histamine (HA, 10^{-6}-3×10^{-5} g/ml) and Ach (10^{-6}-3×10^{-4} g/ml) contracted the guinea pig lower esophagus. The response to HA was converted to relaxation in the presence of the HA H_1-receptor antagonist, chlorpheniramine maleate. This relaxation was blocked by cimetidine. The results suggest that the circular and smooth muscle of the lower esophagus has physiological and pharmacological characteristics different from the muscle of the esophageal body, and that there are α- and β-inhibitory adrenoceptors in the circular muscle of the rat lower esophagus as observed in the stomach and intestine.

7302 ANAESTHESIA INDUCTION AND LOWER OESOPHAGEAL SPHINCTER PRESSURE. (Eng.) Laitin-

en, S.; Mokka, R. E. M.; Valanne, J. V. I.; Larmi, T. K. I. (Dept. Surgery, Univ. Oulu, Oulu, Finland). *Acta Anaesthesiol. Scand.* 22(1):16-20; 1978.

To investigate the effects of some drugs generally used in premedication for, and induction of, anesthesia on the lower esophageal sphincter (LES) and to investigate the effect of the interaction between atropine (AT) and metoclopramide (MC) on the LES pressure (LESP), a study was carried out in 30 mongrel dogs using the esophageal manometric technique. Three groups of 10 dogs each were treated as follows after thiopental (10 mg/kg, i.v.) anesthesia was induced and basal LESP was measured: group I received AT (0.01 mg/kg) followed 5 min later by MC (0.2 mg/kg), both i.v.; group II received AT and MC in reverse order of group I; and group III received succinylcholine (SC, 0.5 mg/kg, i.v.). In group I, AT reduced LESP from 12.6 ± 3.0 mm Hg to 0.8 ± 0.3 mm Hg ($p<0.01$) with maximum effect by 5 min, and subsequent MC administration did not change the lowered LESP. In group II, MC increased LESP from 11.4 ± 2.7 mm Hg to 24.6 ± 5.4 mm Hg ($p<0.01$), and subsequent AT administration did not change the elevated LESP. In group III, SC had no significant lasting effect on LESP, although a transient rise in LESP and in gastric pressure was noted at the depolarization phase. The results indicate that the routine use of MC in premedication for or induction of anesthesia is indicated to prevent the depressant effect of AT on LESP and the possible consequent gastroesophageal reflux, pulmonary aspiration, and postoperative pulmonary complications.

7303 EFFECT OF HYPOVOLEMIC HYPOTENSION AND HYPOVENTILATION ON LOWER ESOPHAGEAL SPHINCTER PRESSURE (LESP). (Eng.) LiCalzi, L. K.; Biancani, P.; Behar, J.; Kerstein, M. D. (West Haven Veterans Admin. Hosp., West Haven, CT). *Surg. Forum* 28:344-346; 1977.

The effects of hypoventilation and hypovolemic hypotension of lower esophageal sphincter pressure (LESP) were investigated in a cat shock model. Cats were hypoventilated for 15 min via a tracheostomy by reduction in the respiratory rate and tidal volume to a level determined by a PCO_2 approaching twice the basal level (which had been established within the normal range). After 30 min of return to normoventilation, all animals were bled 30% of estimated blood volume over 1-2 min, and hypotension was maintained for 15 min before reinfusion resuscitation. Bethanecol (20 µg/kg i.v.) was administered basally and 2 min before reversal of hypoventilation or hypovolemia. Hypoventilation produced significant hypercapnia (PCO_2, 59 mm Hg, $p<0.001$), acidosis (pH 7.016, $p<0.001$), hypoxia (PO_2, 57 mm Hg, $p<0.05$), and a 12.9% reduction in LESP ($p<0.05$); return to normoventilation increased LESP by 4.5% (not significant). Hypovolemia produced a significant decrease in LESP (29%, $p<0.05$); resuscitation caused a 43.6% increase in LESP ($p<0.05$) above the basal level. In the basal state, bethanecol produced a prompt 75.6% increase ($p<0.05$) in LESP, which was blocked by hypoventilation and by hypovolemia. Return to normoventilation following bethanecol produced a 97% increase in LESP ($p<0.05$), and resuscitation produced a 140% increase in LESP ($p<0.05$). The acute effects of hypoventilation on LESP have direct clinical correlations in the patient with respiratory depression of any cause or with pulmonary insufficiency. The blockade of bethanecol by hypoventilation or shock indicates a disorder at the neuromuscular junction or within the smooth muscle of the lower esophageal sphincter.

7304 BRADYKININ ACTION IN THE RAT DUODENUM THROUGH THE CYCLIC AMP SYSTEM. (Eng.) Paegelow, I.; Reissmann, S.; Vietinghoff, G.; Romer, W.; Arold, H. (Dept. Pharmacology Toxicology, Wilhelm-Pieck Univ., Rostock, E. Germany). *Agents Actions* 7(4):447-451; 1977.

The effect of bradykinin (BK) on the rat duodenal cyclic AMP (cAMP) system was investigated *in vitro* and compared with the effect of BK on the rat uterus under the influence of different modulators of BK action. Duodena from female rats and uteri from estradiolbencoate (200 µg/kg, 16-20 hr before experiments)-treated rats were used. BK (6×10^{-11}-10^{-7} M) induced a dose-dependent relaxation of rat duodenum; isoproterenol (3×10^{-9}-4×10^{-6} M) also produced duodenal relaxation. Propranolol (1.8 and 3.5×10^{-5} M) inhibited only the isoproterenol-induced effect. Pretreatment with ACTH (0.003 immunizing U/ml, 5 min) or NaF (10 mM, 2 min) caused significant ($p<0.01$) increases in BK-induced relaxation; the ACTH potentiation continued for 35 min. Theophylline (5.6×10^{-5} M) in the bath also potentiated the BK-induced relaxation. Pretreatment with imidazole (1.5×10^{-4} M, 2 min) significantly ($p<0.05$) inhibited the effect of BK on the duodenum. BK induced a marked contraction in isolated rat uterus; NaF also produced contraction. This contraction was unaffected by ACTH (dose as above), $NaNO_2$ (10^{-4}-10^{-3} M), theophylline (5.6×10^{-6} or 5.6×10^{-5} M), or imidazole (10^{-3} M). BK did not alter the activity of phosphodiesterase (PDE) from plasma membrane fractions of the rat uterus or rat duodenum or of PDE purified from beef heart. Since activators of adenylate cyclase activity and inhibitors of cAMP-PDE activity potentiate BK activity whereas a cAMP-PDE activity stimulator reduces BK activity in the duodenum, BK appears to exert its effect on rat duodenum via the adenylate cyclase system. Such an effect is absent in rat uteri.

7305 THE EFFECT OF BRADYKININ ON THE ELECTRICAL ACTIVITY OF RAT JEJUNUM. (Eng.) Hardcastle, J.; Hardcastle, P. T.; Flower, R. J.; Sanford, P. A. (Dept. Physiology, Sheffield Univ., Sheffield S10 2TN, England). *Experientia* 34(5): 617-618; 1978.

To investigate the possibility that kinins may contribute to the diarrhea that accompanies certain pathological conditions associated with an elev-

ated blood kinin level, bradykinin (0.01-6 μg, i.v.) was administered to rats, and the potential difference (PD) across the jejunum and colon was measured. Bradykinin caused a rapid and transient increase in PD across both tissues; the response was dose-dependent and showed a sigmoid relationship to dose in both tissues. Indomethacin (16 mg/kg, s.c.) caused no change in the endogenous PD of the two tissues, but it significantly reduced the effect of bradykinin; the maximal jejunal response was reduced from 4.1 ± 0.6 to 2.9 ± 0.6 mV ($0.01>p>0.001$), and the maximal colonic response was reduced from 3.9 ± 0.8 to 1.7 ± 0.7 mV ($0.05>p>0.01$). This reduction suggests that bradykinin exerts its effect by stimulating the production of endogenous prostaglandins. The possibility that bradykinin contributes to the diarrhea seen in carcinoid syndrome by inducing a net secretory state in the intestine is discussed.

7306 EFFECTS OF HYDROCHLORIDES OF AMINO ACIDS IN TEST MEALS ON GASTRIC EMPTYING. (Eng.) Fisher, M.; Hunt, J. N. (Guy's Hosp. Medical Sch., London, England). *Digestion* 16(1/2):18-22; 1977.

To extend knowledge of the action of amino acids on gastric emptying, the effects of hydrochlorides of glycine, alanine, arginine, phenylalanine, and tryptophan were studied in four subjects. The subjects received test solutions containing varying amounts of the hydrochlorides and phenol red via a stomach tube. The gastric contents were recovered after 20 min. The volume of the original meal recovered was assessed from the amount of phenol red aspirated. In all subjects, increasing the concentration of amino acid hydrochloride in the given solution caused an increase in the volume recovered. Tryptophan hydrochloride and phenylalanine hydrochloride were significantly more effective than were the other three ($p<0.01$ and $p<0.05$, resp.). The slowing of gastric emptying of amino acid hydrochlorides is consistent with their action as weak acids. However, the effect of tryptophan and phenylalanine is slightly greater than is predicted on the basis of their actions as acids.

7307 GALLBLADDER MUSCLE RESPONSE TO CHOLECYSTOKININ, GASTRIN, SECRETIN, GLUCAGON AND SERUM CONSTITUENTS: USE AS A BIOASSAY FOR SERUM CHOLECYSTOKININ [Abstract]. (Eng.) Rey, J. F.; Howard, J. M.; Harvey, R. F.; Delmont, J. (Bristol Royal Infirmary, Bristol, England). *Digestion* 16(1/2):217; 1977.

7308 AN AXO-AXONIC SYNAPSE BETWEEN ADRENERGIC AND CHOLINERGIC AXONS IN THE MAMMALIAN GUT [Abstract]. (Eng.) Manber, L.; Gershon, M. D. (Columbia Univ., Coll. Physicians and Surgeons, New York, NY 10032). *Fed. Proc.* 37(3):227; 1978.

7309 INTRINSIC ABILITIES OF THE CAT INTESTINE TO DO PROPULSIVE WORK ON A FLUID LOAD [Abstract]. (Eng.) Weems, W. A.; Seygal, G. E. (Univ. Texas Medical Sch., Houston, TX 77025). *Fed. Proc.* 37(3):228; 1978.

7310 A SPLIT BOWEL TECHNIQUE FOR PHYSICAL DECOUPLING OF INTESTINAL MOTOR SYSTEMS [Abstract]. (Eng.) Tansy, M. F.; Martin, J. S.; Landin, W. E.; Kendall, F. M. (Temple Univ., Philadelphia, PA 19140). *Fed. Proc.* 37(3):373; 1978.

7311 THE RELEASE OF GASTRIN, PP, VIP AND MOTILIN FOLLOWING AN ORAL WATER LOAD AND ATROPINE IN MAN [Abstract]. (Eng.) Modlin, I.; Bloom, S. R.; Christofides, N.; Sarson, D. L.; Albuquerque, R. H.; Ghatei, M. A.; Adrian, T. E. (Hammersmith Hosp., London, England). *Fed. Proc.* 37(3):374; 1978.

7312 MECHANICAL RESPONSES OF CANINE INTESTINAL MUSCLE LAYERS TO ENTEROHORMONES [Abstract]. (Eng.) Martin, J. S.; Tansy, M. F.; Landin, W. E.; Kendall, F. M. (Temple Univ., Philadelphia, PA 19140). *Fed. Proc.* 37(3):373; 1978.

7313 THE EFFECT OF BETHANECHOL OR THE GASTROINTESTINAL HORMONES ON IN VITRO COLONIC MYOELECTRICAL ACTIVITY OF THE CAT [Abstract]. (Eng.) Snape, W. J., Jr.; Cohen, S. (Univ. Pennsylvania Hosp., Philadelphia, PA 19104). *Fed. Proc.* 37(3):373; 1978.

7314 ROLE OF GASTRIN IN THE REGULATION OF LOWER ESOPHAGEAL SPHINCTER: A CRITICAL REEVALUATION. (Eng.) Binder, H. J. (Yale Univ. Sch. Medicine, 333 Cedar St., New Haven CT 06510). *South. Med. J.* 71(Suppl. 1):48-51; 1978.

7315 REMINISCENCES ON THE ANTIREFLUX MECHANISM. (Eng.) Edwards, D. A. W. (Rayne Inst., University St., London WC1, England). *South. Med. J.* 71(Suppl. 1):2-7; 1978.

7316 LATERAL-HOLE CATHETERS COMPARED WITH SHIELDED-HOLE CATHETER SYSTEMS IN OESOPHAGEAL MANOMETRY. (Eng.) Sundstrom, G.; Ulmsten,

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U. (Sundsvalls Sjukhus, Fack, S-581 86 Sundsvall, Sweden). *Scand. J. Clin. Lab. Invest.* 37(7):661-665; 1977.

7317 EFFECT OF ANTI-PARKINSONISM DRUGS ON GASTRIC EMPTYING AND INTESTINAL TRANSIT IN THE RAT. (Eng.) Feldman, S.; Putcha, L. (Coll. Pharmacy, Univ. Houston, Houston, TX 77004). *Pharmacology* 15(6):503-511; 1977.

7318 EFFECTS OF PENTAZOCINE ON THE INTESTINE AND BILIARY TRACT OF THE RABBIT IN VITRO. (Eng.) Tonini, M.; Lecchini, S.; Frigo, G. M.; Crema, A. (Inst. Medical Pharmacology, Univ. Pavia, Piazza Botta 10, I-27100 Pavia, Italy). *Naunyn Schmiedebergs Arch. Pharmacol.* 299(3):207-210; 1977.

See also, 7437, 7448, 7467, 7498, 7520, 7720.

SECRETION AND METABOLISM

7319 IN VITRO EFFECTS OF ELEDOISIN ON AMYLASE SECRETION AND CYCLIC AMP CONCENTRATION OF RAT'S PAROTIDS. (Eng.) DeCaro, G.; Cantalamessa, F.; Giacinti, N. (Istituto di Farmacologia e Farmacognosia, Universita di Camerino, Italy). *Farmaco [Sci.]* 32(9):686-688; 1977.

Preliminary experiments on the *in vitro* effects of eledoisin on the cyclic AMP (cAMP) concentration in rat parotid glands are reported. Slices of rat parotid glands were incubated in eledoisin (50, 100, or 1,000 ng/ml) or in buffer alone (control) for 45 min, after which amylase activity in the medium and cAMP concentration in the tissue were determined and expressed as percentages in comparison with controls (arbitrarily set equal to 100%). Eledoisin produced a dose-dependent increase in amylase activity (138.3 ± 8.2, 196.6 ± 19.4, and 202.7 ± 14.8%, resp., for the 3 doses), but its effect on cAMP concentration was erratic, with both increases and reductions. The mean values indicate a fall in cAMP level with increasing eledoisin dose (76.5 ± 15.2, 75.9 ± 22.3, and 62.1 ± 28.7%, resp., for the 3 doses). It does not appear that eledoisin's stimulatory effect on parotid gland amylase secretion is mediated by cAMP.

7320 ACETYLSALICYLIC ACID HYDROLASE: A PREDOMINANTLY GASTROINTESTINAL ENZYME [Abstract]. (Eng.) Nowell, R. M.; Spenney, J. G. (Univ. Alabama in Birmingham, Birmingham, AL). *Fed. Proc.* 37(3):459; 1978.

7321 PANCREATIC AND GASTROINTESTINAL SOMATOSTATIN CELLS IN THE HUMAN FETUS [Abstract]. (Eng.) Paulin, C.; Dubois, M. P.; Assan, R.; Chayvialle, J. A.; Dubois, P. M. (UER Medicale Lyon Sud-Ouest, B.P. 12, 69600 Oullins, France). *Digestion* 16(1/2):216-217; 1977.

7322 IMMUNOFLUORESCENCE-MICROSCOPIC DEMONSTRATION OF MYOSIN AND ACTIN IN SALIVARY GLANDS AND EXOCRINE PANCREAS OF THE RAT. (Eng.) Drenckhahn, D.; Groschel-Stewart, U.; Unsicker, K. (Dept. Anatomy, Univ. Kiel, D-2300 Kiel, W. Germany). *Cell Tissue Res.* 183(2):273-279; 1977.

7323 ELECTRICAL COUPLING AND DYE TRANSFER BETWEEN ACINAR CELLS IN RAT SALIVARY GLANDS. (Eng.) Hammer, M. C.; Sheridan, J. D. (Dept. Genetics, Univ. Minnesota, Minneapolis, MN 55455). *J. Physiol. (Lond.)* 275:495-505; 1978.

7324 BETA-ADRENERGIC RECEPTORS AND ADENYLATE CYCLASE IN HYPERTROPHIC AND HYPERPLASTIC RAT SALIVARY GLANDS. (Eng.) Burke, G. T.; Barka, T. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY 10029). *Biochim. Biophys. Acta* 539(1):54-61; 1978.

See also, 7300, 7336, 7441, 7770.

7325 THE CYTOPROTECTIVE EFFECT OF MUCOSAL BLOOD FLOW IN EXPERIMENTAL EROSIVE GASTRITIS. (Eng.) Moody, F. G.; McGreevy, J.; Zalewsky, C.; Cheung, L. Y.; Simons, M. (Univ. Utah Coll. Medicine, Salt Lake City, UT). *Acta Physiol. Scand.* (Suppl.):35-43; 1978.

To elucidate the role of mucosal blood flow in the injury that contributes to or follows the breaking of the cation barrier of the gastric secretory epithelium of most mammals, gastric mucosal blood flow (MBF) was studied in anesthetized dogs by aminopyrine clearance or a radioactive microsphere technique. Substances known to enhance ion exchange that disrupt the cation barrier and produce acute erosive gastritis were used: aspirin (20 mM in 0.14 N HCl), alcohol (25% weight/volume), bile salts (20-40 mM sodium taurocholate in 0.14 N HCl), chloromercuribenzene sulfonate (PCMBS, 10 mM in 0.1 M Tris buffer, pH 7.8), and carbenoxolone (0.25% in 1 N saline, pH 7.5). PCMBS caused minimal mucosal injury. The MBF/H^+ back-diffusion ratio was 0.54 ± 0.13 prior to PCMBS and 0.33 ± 0.11 after PCMBS when H^+ loss increased from 1.78 ± 0.63 to 17.8 ± 2.17 μEq/min. When the MBF/H^+ loss ratio was reduced by blood withdrawal (restriction of mucosal perfusion) to 0.07 ± 0.01, massive disruption of the mucosal surface ensued. Carbenoxolone produced a nearly fourfold increase in H^+ to Na^+ exchange and a comparable large increase in mucosal perfusion. The major histological finding was the *in situ* degeneration of mucus cells accompanied by the intracellular solubilization of mucus. Aspirin induced small, multiple, well-circumscribed lesions, but a fourfold increase in mucosal perfusion provided complete protection against injury accompanied by a lesser rate of H^+ back-diffusion. In severe injury, blood flow and H^+ loss were 8.8 ± 0.8 ml/min and -22.3 ± 1.7 μEq/min, resp., whereas in the absence of mucosal injury, these parameters were 36.3 ± 3.4 ml/min and -17.3 ± 2.2 μEq/min, resp. Alcohol injury was mild, with only minimal disturbance in the appearance of the mucosal surface. Bile salts produced a severe injury, with eschar formation over the rugal crest. The results show that in the presence of a rapid rate of H^+ permeation, a decrease in MBF leads to erosive gastritis while an increase in MBF protects gastric mucosa from chemical injury.

7326 MECHANISM OF STRESS ULCER: INFLUENCE OF α-ADRENERGIC BLOCKADE ON STRESS ULCERATION AND GASTRIC MUCOSAL ENERGY METABOLISM. (Eng.) Menguy, R.; Masters, Y. F. (Genesee Hosp., 224 Alexander St., Rochester, NY 14607). *Am. J. Dig. Dis.* 23(6):493-497; 1978.

Experiments were carried out in which splanchnic vasoconstriction during hypovolemia was prevented by α-adrenergic blockade during the state of shock to test the hypothesis that a rapid and profound decrease in mucosal energy metabolism (energy deficit) is responsible for mucosal necrosis during shock-induced gastric mucosal ischemia. Six male albino rabbits subjected to hemorrhagic hypotension for 58-120 min without α-adrenergic blockade all showed severe stress ulceration 60 min after reinfusion, whereas six rabbits subjected to such shock for 120 min with α-adrenergic blockade (phentolamine mesylate, 0.2 g/kg, i.v., followed by 0.02 mg/kg/min until reinfusion) showed no more than minimal gross lesions of stress ulceration (average severity of microscopic mucosal damage on a scale of 0-5 in the fundus, corpus, and antrum were 4.3, 4.2, and 2.5, resp., in the controls and only 1.8, 1.7, and 0.6, resp., in the treated rabbits). In the animals with α-blockade, the indices of mucosal energy metabolism were markedly different from those in animals without blockade. In the former group, the levels of ATP and of ATP + ADP + AMP and the energy charge of the adenylate pool decreased significantly less in all three regions of the gastric mucosa ($p<0.001$-$p<0.05$), and the expected rise of AMP level in the fundus and corpus did not occur in the treated animals. By comparison with unshocked animals, the levels of free glucose, glucose-6-phosphate, fructose-6-phosphate, fructose-1-6-diphosphate, lactate, and pyruvate increased significantly in the fundic and corpus mucosa of all shocked rabbits ($p<0.001$-$p<0.05$), suggesting an increase in the rate of glycolysis. These results support the conclusion that α-adrenergic blockade prevents stress ulceration due to protracted hypotension. The sparing of the mucosa was associated with a significant reduction in mucosal energy deficit, but the association is not sufficient to prove the hypothesis that stress ulceration results from an energy deficit severe enough to cause cell death.

7327 EFFECTS OF CHRONIC PENTAGASTRIN STIMULATION ON PARIETAL CELL SIZE IN RAT GASTRIC MUCOSA. (Eng.) Helander, H. F. (Dept. Anatomy, Univ. Umea, Umea, Sweden). *Acta. Physiol. Scand.* (Suppl.):19-23; 1978.

The effects of chronic pentagastrin stimulation on rat gastric mucosa were studied with quantitative electron microscopical methods to analyze changes that might occur in the size and number of the parietal cells. Eight male Sprague-Dawley rats received pentagastrin injections (250 μg/kg) every 8 hr for 14 days, and eight control rats received no injections. Animals were fasted for 24 hr, with free access to drinking water, before sacrifice. There were no differences between the two groups with respect to ultrastructure of the gastric mucosa; the shape and subcellular morphology of the

parietal cells appeared similar in the two groups; the thickness of the mucosa was the same in both groups. The mean profile area of the parietal cells was significantly greater ($p<0.005$) in the stimulated rats ($104 \pm 9\ \mu m^2$) than in the controls ($89 \pm 7\ \mu m^2$). The calculated (estimated) mean volume of the parietal cells was thus $635 \pm 76\ \mu m^3$ in the control rats and $797 \pm 111\ \mu m^3$ in the stimulated rats. The volume density of the epithelial cells and of the parietal cells was significantly greater ($p<0.005$) in the stimulated rats ($52 \pm 4.9\%$ and $16 \pm 2.7\%$, resp.) than in the control rats ($44 \pm 4.5\%$ and $12 \pm 1.5\%$, resp.). The number of parietal cells per unit volume of mucosa was calculated by dividing the parietal cell volume densities by the mean parietal cell volumes; it was $194,000 \pm 24,000/mm^3$ in the controls and $198,000 \pm 32,000/mm^3$ in the stimulated rats. The data show that the trophic effects of chronic pentagastrin stimulation include hypertrophy of the parietal cells.

7328 DIRECT STIMULATORY ACTION OF PENTAGASTRIN ON THE ADENYLATE CYCLASE OF RAT STOMACH MUCOSA. (Eng.) Nafrady, J.; Wollemann, M. (Univ. Medical Sch., 6701-Szeged, P.O. Box 469, Hungary). *Biochem. Pharmacol.* 26(21):2083-2085; 1977.

The effect of low doses of pentagastrin on adenylate cyclase activity in rat stomach was examined *in vitro*. The basal adenylate cyclase activity of female Wistar rat gastric mucosa particulate cell fractions was significantly enhanced by the addition of either 10^{-4} M histamine or 33 nM pentagastrin. Doses of pentagastrin as low as 330 pM also caused stimulation. The simultaneous addition of metiamide (10^{-4} M) with histamine (10^{-4} M) completely inhibited histamine-induced adenylate cyclase stimulation, but the administration of 10^{-4} M metiamide with 33 nM pentagastrin had no effect. Because an H_2 receptor antagonist fails to inhibit pentagastrin-stimulated adenylate cyclase activity, pentagastrin receptors must be directly connected with adenylate cyclase in the rat stomach mucosa.

7329 SYMPATHETIC NEUROENDOCRINE REGULATION OF GASTRIC INHIBITORY POLYPEPTIDE RESPONSE TO GLUCOSE. (Eng.) Sirinek, K. R.; Cataland, S.; O'Dorisio, T.; Mazzaferri, E. L.; Crockett, S.; Pace, W. G. (Ohio State Univ. Coll. Medicine, Columbus, OH). *Surg. Forum* 28:377-379; 1977.

The effect of exogenous sympathomimetic and sympatholytic drugs on both basal and glucose-stimulated gastric inhibitory polypeptide (GIP) release was studied in dogs. The i.v. infusion of isoproterenol (5 μg/kg/hr), propranolol (5 μg/kg/hr), epinephrine (5 μg/kg/hr), norepinephrine (0.5 μg/kg/hr), or dibenzylene (0.5 mg/kg/hr) had no effect on fasting GIP concentrations. Compared with fasting concentrations, incremental GIP was significantly ($p<0.05$) increased at 15, 30, and 45 min for all treatment groups. Compared with intraduodenal glucose alone, the GIP response following intraduodenal glucose (50 ml, 20% glucose) plus i.v. dibenzylene was significantly ($p<0.05$) greater at 15 and 30 min. Compared with glucose alone, the GIP response following glucose and propranolol was significantly ($p<0.05$) less at 15 and 30 min. This study demonstrates both augmentation and blunting of glucose-stimulated GIP release by sympatholytic drugs, suggesting a physiologic role for the sympathetic neuroendocrine system in modulating the GIP response to glucose.

7330 A FAT-ENRICHED MEAL AUGMENTS GASTRIC INHIBITORY POLYPEPTIDE AND SUPPRESSES GASTRIN CONCENTRATIONS. (Eng.) Tetirick, C. E., Jr.; O'Dorisio, T.; Sirinek, K. R.; Cataland, S.; Pace, W. G. (Ohio State Univ. Coll. Medicine, Columbus, OH). *Surg. Forum* 28:379-380; 1977.

Because it has been previously shown that exogenous gastric inhibitory polypeptide (GIP) suppresses the serum gastrin response to a meal, studies were carried out to determine whether GIP may physiologically modify gastrin release. GIP release was stimulated in experimental dogs by feeding a meal containing 67 g of fat (fat-enriched meal). Controls received a meal containing 20 g of fat. The mean change in serum GIP concentration at 75, 90, 105, and 120 min was significantly greater ($p<0.05$) with the fat-enriched meal than with the control meal. Conversely, the mean serum change in gastrin response was markedly reduced at 75, 90, 105, and 120 min in the fat-enriched meal as compared with the control meal. These results demonstrate that the enrichment of a meal with fat enhances GIP release, and that this release is temporally associated with a diminution in serum gastrin response during the second postcibal hour. This response suggests that endogenous GIP release may physiologically modify meal-stimulated gastrin response.

7331 INTRAVENOUS INFUSION OF AMINO ACIDS STIMULATES GASTRIC ACID SECRETION IN MAN. (Eng.) Isenberg, J. I.; Maxwell, V. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA 90073). *N. Engl. J. Med.* 298(1):27-29; 1978.

To determine whether the acid secretory effect of intestinal protein perfusion is in part due to the absorption of amino acids and small peptides from the gut, the effect of i.v. amino acid infusion on gastric acid secretion was studied in six men. The i.v. infusion of 10.6, 21.2, or 42.5 g of a mixture of L-amino acids significantly ($p<0.05$) stimulated gastric acid secretion. The response to 21.2 and 42.5 g of i.v. amino acids (29.8 ± 7.6 mEq/4 hr at 42.5 g) was similar to that of 42.5 g of intraduodenal amino acids (36.3 ± 6.8 mEq/4 hr), and was significantly greater ($p<0.05$) than the response to a control i.v. infusion of sodium chloride alone (7.1 ± 3.3 mEq/4 hr). The addition of 250 g of glucose to the i.v. infusion did not significantly alter secretory responses. The serum gastrin level did not significantly change during the i.v. amino acid infusions. The maximal acid secretory response to 21.2 and 42.5 g of i.v. amino acids was approximately one-third of the response to either intragastric amino acids

or the maximal response to pentagastrin. The observation that the secretory response to i.v. amino acids is similar to that produced by small intestinal amino acids suggests that the intestinal phase of gastric acid secretion in man may be mediated totally or in part by the absorption of amino acids from the gut.

7332 STUDIES ON THE ROLE OF SEROTONIN IN GASTRIC PEPSIN SECRETION. (Eng.) Wanza, M. F.; Stein, T.; Wise, L. (Long Island Jewish-Hillside Medical Center, New Hyde Park, NY). *Surg. Gynecol. Obstet.* 146(6):929-932; 1978.

To evaluate further the role of serotonin in pepsin secretion, studies were carried out in eight female mongrel dogs each provided with a Heidenhain pouch and with a gastric cannula to divert the acid secreted by the remaining stomach away from the duodenum. Histamine was infused (0.04 mg/kg/hr) for the entire 4-hr study period; when given alone it constituted the control. When reserpine (0.1 mg/kg, i.m.) was given 24 hr before histamine infusion to deplete the serotonin level, the initial histamine-induced peaks in pepsin concentration (47 ± 20 x 10^3 PU^{Hb} [hemoglobin substrate]/ml) and output (169 ± 41 x 10^3 PU^{Hb}/ml) were abolished ($p<0.05$). Serotonin replacement by 5-hydroxytryptophan significantly increased ($p<0.05$) both the pepsin concentration (38 ± 12 x 10^3 PU^{Hb}/ml) and output (318 ± 117 x 10^3 PU^{Hb}/ml). The administration of the serotonin antagonist 1-methyl-d-lysergic acid butanol-amide significantly reduced the histamine-induced peaks of pepsin concentration (from 42 ± 7 x 10^3 to 5 ± 3 x 10^3 PU^{Hb}/ml, $p<0.05$) and output (from 213 ± 47 x 10^3 to 20 ± 8 x 10^3 PU^{Hb}/ml, $p<0.01$). These data suggest that serotonin is a stimulator of histamine-stimulated pepsin secretion in denervated gastric pouches in dogs.

7333 UNCOVERING RHYTHMS IN SERUM GASTRIN. (Eng.) Saik, R. P.; Weisenfeld, N.; Greenburg, A. G.; Kripke, D.; Peskin, G. (Veterans Admin. Hosp., 112E, 3350 La Jolla Village Drive, San Diego, CA 92161). *J. Surg. Res.* 24(5):380-383; 1978.

Because rhythms in acid output have been documented in man without corresponding rhythms in serum gastrin, a study was undertaken in dogs to uncover such rhythms, unencumbered by the influence of feeding, and to assess the importance of diverting acid from the antrum. Peripheral serum gastrin levels were sampled basally and every 2 hr for 24-hr periods in three groups of mongrel dogs fasted with access to water on the day prior to each study (2 studies/dog). In group I (4 normal dogs), a consistent circadian rhythm was evidenced by the nonrandom ($p<0.05$) phase angle distribution of the occurrence of peak gastrins, the circadian amplitude being 100%. In group II (3 dogs in which an innervated antral pouch was exteriorized to eliminate the effects of acidity), the phase angle distribution was random. In group III (5 dogs with innervated antral pouches explanted onto the transverse colon to achieve a hypergastrinemic state), serum gastrin levels were consistently more than double the preoperative levels, but the phase angle distribution was again random. It is concluded that a circadian rhythm of gastrin exists in the dog and is abolished by removing acid or by continuous maximal stimulation, suggesting that the rhythm is dependent on intraluminal pH and independent of vagal activity per se except as this activity may affect acid output. Physiological distention may also play a role in the circadian release of gastrin.

7334 THE ACTION OF INTRAVENOUS ETHANOL ON GASTRIC SECRETION. (Eng.) Kondo, T.; Magee, D. F. (Nagoya Univ., Nagoya, Japan). *Proc. Soc. Exp. Biol. Med.* 156(2):299-302; 1977.

Experiments were carried out in dogs to test the hypothesis that gastrin is the mediator through which ethanol stimulates gastric secretion. Four dogs with Heidenhain pouches and five with gastric fistulae and innervated antral pouches were used after 18-hr fasts in experiments involving ganglionic and cervical vagal blocks and in experiments with antral pouch acidification, resp. Ganglionic block was induced with pertolinium tartrate (usually 1 mg/kg, s.c.) at the start of ethanol infusion (4 ml/min, i.v. of 10% ethanol) with atropine (1 mg, i.m.) superimposed after 60 min. Cervical vagi were blocked by infiltration anesthesia using 2% Xylocaine to both nerves 30 min after beginning the ethanol infusion. Antral acidification was accomplished by intubation with 0.1 N HCl (10 ml/min), and ethanol infusion was begun when the resting secretion from the stomach was nearly zero. The i.v. infusion of ethanol (control) stimulated fistula acid and pepsin secretion and Heidenhain pouch acid but not pepsin secretion. Ganglionic blockade eliminated ethanol-stimulated fistula acid and pepsin secretion and diminished the pouch acid and pepsin secretion; the addition of atropine reduced pouch and fistula acid secretion to basal levels ($p<0.05$). Cervical vagal block did not suppress either fistula or pouch acid or pepsin secretion. After antral acidification to pH 1, ethanol no longer stimulated fistula acid or pepsin secretion, but a return to pH 7 caused steep increases in both secretions. It is concluded that i.v. ethanol administration stimulates gastric secretion mainly by liberating antral gastrin.

7335 EFFECTS OF ORAL CALCIUM AND MAGNESIUM ADMINISTRATION ON GASTRIC ACID SECRETION AND SERUM GASTRIN CONCENTRATION IN MAN. (Eng.) Mazzacca, G.; Budillon, G.; D'Agostino, L.; D'Agostino, E.; Buonocore, S. (II Clinica Medica dell'Universita di Napoli, Napoli, Italy). *Rend. Gastroenterol.* 9(2):105-108; 1977.

To examine whether the simultaneous ingestion of calcium and magnesium compounds can abolish the gastric stimulation observed after p.o. calcium ingestion alone, studies were carried out in seven healthy volunteers that had fasted overnight. Test

solutions were given by intubation, and gastric secretion and blood were sampled for 2 hr. After 2 g calcium carbonate, gastric acid output increased during the 1st hr in all subjects; after magnesium hydroxide (8.0 ml milk of magnesia), gastric acid output was unchanged in five and decreased slightly in two; and after a combination of the two antacids, gastric acid output was unchanged in four and slightly increased in three. The mean acid secretory response to calcium carbonate was significantly increased above the basal level in both the 1st ($p<0.001$) and 2nd ($p<0.01$) hr, but it was unchanged by magnesium hydroxide or by both antacids together. Ingestion of calcium carbonate alone or calcium carbonate plus magnesium hydroxide produced a significant rise ($p<0.01$) in serum gastrin concentration above the basal level at both 30 and 60 min, but there was no change after magnesium hydroxide ingestion. Because magnesium ingestion antagonizes the effect of p.o. calcium on gastric acid secretion, the use of antacid preparations containing both magnesium and calcium appears warranted in short-term therapy.

7336 SOMATOSTATIN INHIBITS AND REVERSES HYPERGASTRINEMIA INDUCED BY PARATHYROID HORMONE, CALCIUM, AND ACETYLCHOLINE. (Eng.) Bolman, R. M., III; Cooper, C. W.; Garner, S. C.; Wells, S. A., Jr. (Duke Univ. Medical Center, Durham, NC). *Surg. Forum* 28:373-374; 1977.

The effects of somatostatin (somatotropin release-inhibiting factor, SRIF) on gastrin release induced by parathyroid hormone (PTH), calcium, or acetylcholine (ACH) were studied in anesthetized pigs. Test substances were infused directly into the antral circulation via a catheter in the right gastroepiploic artery. Synthetic SRIF (1.67-16.7 μg/min), infused together with PTH (bovine 1-84 or synthetic human 1-34, 0.04-0.4 U/min), prevented the 20- to 30-fold rise in gastrin observed following the infusion of equal doses of PTH alone ($p<0.001$). Infusion of SRIF (1.67 μg/min) together with 0.05 M $CaCl_2$ in five pigs markedly inhibited the large increase in gastrin release produced by $CaCl_2$ alone ($p<0.05$ to $p<0.001$). Infusion of SRIF (3.34-16.7 μg/min) together with 0.1 M ACH largely inhibited the 10- to 20-fold rise in gastrin observed following infusion of ACH alone in four of six pigs ($p<0.05$ to $p<0.005$ in 3 of 4 pigs). Infusion of SRIF (1.67-16.7 μg/min) after stimulation of gastrin secretion by PTH, $CaCl_2$, or ACH produced a rapid and pronounced decrease in gastrin secretion (after PTH, -75%, $p<0.005$ in 3 pigs; after Ca, -79%, $p<0.025$ in 3 of 4 pigs; after ACH, -86%, $p<0.05$ to $p<0.001$ in 5 pigs). It is concluded that SRIF inhibits gastrin release induced by PTH, Ca, or ACH and also reverses a hypergastrinemia evoked by any of these secretagogues. SRIF is thus a useful tool for studying mechanisms involved in gastrin release.

7337 GASTRIN STIMULATED H^+ SECRETION IN AMPHIBIAN GASTRIC MUCOSA: EFFECT OF TETRODOTOXIN. (Eng.) Spenney, J. G. (Veterans Admin. Hosp., Birmingham, AL 35294). *Experientia* 34(5): 625-626; 1978.

The role of neural mechanisms in gastrin-stimulated H^+ secretion was studied in amphibian gastric fundic mucosa using tetrodotoxin, a compound that blocks neural Na^+ channels. Adult bullfrog mucosa was mounted in an *in vitro* preparation. The initial H^+ secretion rate was measured, and then burimamide (10^{-4}-10^{-3} M) was added to the serosal solution; H^+ secretion was totally inhibited. Tetrodotoxin (3.0×10^{-6} M) and then pentagastrin (3.3×10^{-6} M) were added to the serosal solution. Burimamide produced a rise in transmucosal potential difference (PD) and resistance (R) coincident with H^+ secretion inhibition. Tetrodotoxin added to either the spontaneously-secreting or resting mucosa had no effect on H^+ secretion and no consistent or significant effect on PD or R. Pentagastrin added in the presence of tetrodotoxin was an effective stimulant of gastric H^+ secretion (the average rise was to 5.22 μmol/cm^2/hr from 0); the PD and R decreased. The failure of tetrodotoxin to block gastrin stimulation of H^+ secretion indicates that neural mechanisms are not required.

7338 EFFECT OF VAGAL STIMULATION ON THE CONCENTRATION OF GASTRIN IN SERUM AND ANTRAL MUCOSA IN DOGS. (Eng.) Watayou, T.; Ramus, I.; Thompson, J. C. (Univ. Texas Medical Branch, Galveston, TX 77550). *Arch. Surg.* 113(1):87-89; 1978.

The rapidity and duration of gastrin release at the antrum after electrical stimulation of the vagus nerve were assessed in dogs, and the changes in gastrin concentration in antral mucosa that result from this vagal stimulation were measured. Electrical vagal stimulation produced a significant increase in the circulating serum gastrin concentration at 1 min to 1 hr after the initiation of the stimulus ($p<0.05$). After 1 hr of continued stimulation, the antral gastrin concentration also increased significantly ($p<0.02$). The results suggest that vagal release of gastrin triggers its rapid synthesis.

7339 GASTRIN: OBLIGATORY INTERMEDIATE IN THE POSTPRANDIAL MOBILIZATION OF GASTRIC HISTAMINE IN THE RAT. (Eng.) Hakanson, R.; Hedenbro, J.; Liedberg, G.; El Munshid, H. A.; Rehfeld, J. F. (Dept. Pharmacology, Univ. Lund, Lund, Sweden). *Experientia* 33(11):1541-1543; 1977.

The effects of antral gastrin and of vagal excitation on postprandial histamine release in the rat were investigated. Adult male Sprague-Dawley or Wistar rats underwent radical antrectomy (pyloric gland area, the adjacent portion of the oxyntic gland area, and the duodenal bulb) with great care to eliminate the entire lesser curvature. The nervous and vascular supply to the remainder of the stomach was spared. After recovery, all rats were fasted 48 hr; group 1 remained fasted (control), group 2 received food for 1 hr, and group 3 received pentagastrin s.c. After sacrifice at dif-

ferent times over a 5-hr period, serum gastrin was determined radioimmunochemically, the oxyntic mucosal histamine level was determined fluorometrically, and oxyntic histidine decarboxylase activity was determined radiometrically. In unoperated fasted rats, feeding raised the serum gastrin concentration ($p<0.001$), reduced the mucosal histamine concentration ($p<0.001$-0.01), and activated histidine decarboxylase activity ($p<0.001$) to significant degrees; feeding failed to elicit any of these effects in antrectomized rats. In unoperated fasted rats, pentagastrin reduced the histamine concentration over the first 2 hr ($p<0.001$-0.01) and activated the histidine decarboxylase activity ($p<0.001$). In operated, fasted rats, the basal histamine level was lower than in control rats, but they still responded to pentagastrin administration with reduction of the histamine level (significant at 1 hr, $p<0.001$) and activation of histidine decarboxylase activity ($p<0.001$-0.01). It is concluded that antral gastrin is an obligatory mediator of the postprandial activation of histidine decarboxylase and mobilization of histamine.

7340 n-METHYL, 5-METHYL HISTAMINE EVOKES A HIGHER MAXIMAL RATE OF GASTRIC ACID SECRETION THAN HISTAMINE. (Eng.) Impicciatore, M.; Bertaccini, G.; Mossini, F.; Hansen, D.; Grossman, M. I. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA 90073). *Proc. Soc. Exp. Biol. Med.* 156(2):296-298; 1977.

The effects of the histamine H2 receptor antagonist *N*-methyl, 5-methyl histamine (dimethylhistamine, DMH) on acid secretion in gastric fistula cats was investigated. When graded doses of DMH (10-5,120 μg/kg/hr) or histamine (10-640 μg/kg/hr) were given i.v. at 30-min intervals, the maximal response to DMH was significantly greater than that to histamine ($p<0.02$). When graded doses of histamine (80-2,560 μg/kg/hr) were given i.v. at 30-min intervals with and without a constant background of the histamine H1 receptor antagonist pyrilamine (4 mg/kg loading dose plus 2 mg/kg/hr), the maximal response to histamine plus pyrilamine was significantly greater than that to histamine alone ($p<0.02$). When graded doses of DMH (320-5,120 μg/kg/hr) were given i.v. at 30-min intervals with and without a constant background of histamine (double the dose needed for maximal response), the maximal response to DMH was significantly lower in the presence of histamine ($p<0.02$) than in its absence. The maximal response to the combined drugs was similar to the maximal response to histamine alone. These findings are compatible with the hypothesis that, in addition to the well known action of histamine on H2 receptors, it also acts on H1 receptors to inhibit gastric acid secretion.

7341 EFFECT OF CIMETIDINE ON ION FLUXES AND POTENTIAL DIFFERENCE ACROSS THE HUMAN STOMACH. (Eng.) Ivey, K. J.; Mackercher, P. A. (Dept. Medicine, Univ. Missouri, Columbia, MO 65201). *Gut* 19(5):414-418; 1978.

To determine whether the reduction of acid output by cimetidine in man is due entirely to a reduction in acid secretion or whether increased back diffusion of hydrogen ions is also occurring, fluxes of H^+, Na^+, K^+, and Cl^- ions after acid instillation into the stomach were studied in six healthy subjects with and without prior p.o. administration of 300 mg cimetidine. Potential difference across gastric mucosa was measured continuously throughout each study. Cimetidine caused a significant reduction in hydrogen ion secretion (5.05 mEq/15 min in controls versus 2.70 mEq/15 min with cimetidine, $p<0.05$), and consequently a significant reduction in net hydrogen flux into the gastric lumen (2.01 mEq/15 min versus 0.02 mEq/15 min, resp., $p<0.05$). There were no significant differences between sodium ion fluxes in control and cimetidine studies, suggesting that the gastric mucosal barrier remained intact. Cimetidine alone caused a highly significant rise in intragastric pH (to 7) and of potential difference ($p<0.001$). Addition of intragastric acid (pH <1.0) did not reverse the rise in potential difference caused by cimetidine, suggesting that factors other than change in intragastric pH were involved. These studies support the concept that reduction in acid output by cimetidine is due to inhibition of acid secretion, and not to increased permeability to hydrogen ion.

7342 CIMETIDINE AND PROSTAGLANDIN: EVIDENCE FOR DIFFERENT MODES OF ACTION ON THE RAT GASTRIC MUCOSA. (Eng.) Carmichael, H. A.; Nelson, L. M.; Russell, R. I. (Royal Infirmary, Glasgow G4 OSF, Scotland). *Gastroenterology* 74(6):1229-1232; 1978.

Studies were carried out in rats to determine whether cimetidine, like prostaglandin E_2 methyl ester (Me-PGE_2), inhibits aspirin-induced gastric mucosal erosions. The effects of cimetidine and MePGE_2 on aspirin-induced gastric mucosal erosions in the continual presence of HCl were also measured. Cimetidine (50 mg/kg) significantly inhibited ($p<0.01$) gastric mucosal erosions induced by aspirin (192 mg/kg), reducing the incidence from 70% of 20 rats to 9.5% of 21 rats; the mean lesion score was reduced from 9.3 ± 2.1 to 0.4 ± 0.3. The effect of the above doses of Me-PGE_2 and cimetidine on gastric erosions induced by aspirin (192 mg/kg) were compared with the hourly addition of 160 mM HCl. The incidence of erosions in the aspirin plus HCl group was 100% of 20 rats (mean lesion score 27.4 ± 2.4). This incidence was not significantly reduced by cimetidine, the incidence being 90% of 20 rats (mean lesion score 19.7 ± 3.4). The incidence of erosions in the presence of Me-PGE_2 was significantly less than that in both the other groups (13% of 23 rats; mean lesion score 3.1 ± 0.8, $p<0.01$ in both instances). These results suggest that, whereas cimetidine protects the gastric mucosa through acid inhibition, Me-PGE_2 appears to have a protective effect independent of acid inhibition.

7343 EFFECTS OF BLOOD GLUCOSE LEVELS ON ASPIRIN-INDUCED GASTRIC MUCOSAL DAMAGE. (Eng.) MacDonald, A.; Dekanski, J. B.; Gottfried, S.; Parke, D. V.; Sacra, P. (Biorex Lab. Ltd.,

Canonbury Villas, London N1 2HB, England). *Am. J. Dig. Dis.* 22(10):909-914; 1977.

To investigate the effects of fasting and other procedures that affect blood glucose levels on the susceptibility of rats to aspirin-induced (200 mg/kg, p.o.) gastric mucosal damage, female Biorex Wistar rats were studied under various conditions. In rats fasted for 18 hr, blood glucose levels decreased ($p<0.001$), the incidence (100% versus 45% in controls) and severity ($p<0.002$) of mucosal damage increased, and gastric glycoprotein synthesis decreased by 50% ($p<0.05$) compared with controls; glucose (50 mg/ml) in the drinking water prevented these changes. Fed rats with alloxan-induced (100 mg/kg, s.c., for 5 days) diabetes were similar to controls in terms of aspirin-induced mucosal damage and glycoprotein synthesis, but 18-hr fasted diabetic rats had greater incidence (100% versus 50% in controls) and severity ($p<0.05$) of aspirin-induced mucosal damage and greatly decreased glycoprotein synthesis (to 33% of control value, $p<0.01$). In nondiabetic rats, insulin (10 U/kg, s.c.) followed by the removal of food caused a significant fall in blood glucose level ($p<0.001$), an increase in the incidence (100% versus 50% in controls) and severity ($p<0.02$) of aspirin-induced mucosal lesions, and a significant decrease in glycoprotein synthesis (to 19% of control, $p<0.05$). Insulin treatment of alloxan-induced diabetic rats did not change their susceptibility to aspirin-induced mucosal damage (60%) or its severity or the extent of glycoprotein synthesis when compared with untreated diabetic rats. *In vitro* incubation of mucosal homogenates with 10^{-4} M dibutyryl cyclic AMP or 10^{-4} M theophylline decreased glycoprotein synthesis significantly ($p<0.05$) to 60% and 62%, resp., of control, but incubation with dibutyryl cyclic GMP (10^{-4} M) had no significant effect. The results indicate that hypoglycemia may be a factor in the susceptibility of rats to aspirin-induced gastric mucosal damage and that cyclic AMP may be involved in the synthesis and secretion of mucus from gastric mucosal cells.

7344 EFFECTS OF HISTAMINE, PENTAGASTRIN AND ACETYLCHOLINE ON CANINE GASTRIC SECRETION IN VITRO [Abstract]. (Eng.) Kuo, Y. J.; Shanbour, L. L. (Univ. Texas Medical Sch., Houston, TX 77030). *Fed. Proc.* 37(3):697; 1978.

7345 H^+ TRANSPORT: REGULATION AND MECHANISM IN GASTRIC MUCOSA AND MEMBRANE VESICLES. (Eng.) Sachs, G.; Spenney, J. G.; Lewin, M. (Lab. Membrane Biology, Univ. Alabama, Birmingham, AL). *Physiol. Rev.* 58(1):106-173; 1978.

7346 MUCOSAL LESIONS DUE TO GASTRIC DISTENSION IN THE RAT. (Eng.) Gati, T.; Guth, P. H. (Semmelweis Medical Sch., Budapest, Hungary). *Am. J. Dig. Dis.* 22(12):1083-1090; 1977.

7347 NEONATAL GASTRIC pH. (Eng.) Miclat, N. N.; Hodgkinson, R.; Marx, G. F. (Albert Einstein Coll. Medicine, Bronx, NY). *Anesth. Analg.* 57(1):98-101; 1978.

7348 CHARACTERIZATION AND DEVELOPMENT OF CIMETIDINE AS A HISTAMINE H_2-RECEPTOR ANTAGONIST. (Eng.) Brimblecombe, R. W.; Duncan, W. A. M.; Durant, G. J.; Emmett, J. C.; Ganellin, C. R.; Leslie, G. B.; Parsons, M. E. (Smith Kline & French Lab., Ltd., Welwyn Garden City, Hertfordshire, England). *Gastroenterology* 74(2, Part 2): 339-347; 1978.

7349 POTENTIAL MECHANISMS OF INTERACTION AMONG SECRETAGOGUES. (Eng.) Gardner, J. D.; Jackson, M. J.; Batzri, S.; Jensen, R. T. (Building 10, Room 9D-15, Natl. Inst. Health, Bethesda, MD 20014). *Gastroenterology* 74(2, Part 2):348-354; 1978.

7350 EFFECTS OF THE H_2-ANTAGONISTS ON HISTAMINE ACTION AND INTERACTION WITH GASTRIN IN ISOLATED PARIETAL CELLS. (Eng.) Soll, A. H. (Veterans Admin. Center, Building 115, Room 115, Los Angeles, CA 90073). *Gastroenterology* 74(2, Part 2):355; 1978.

7351 CONCENTRATIONS OF ACIDIC ANTIINFLAMMATORY DRUGS IN GASTRIC MUCOSA. (Eng.) Frey, H. H.; El-Sayed, M. A. (Sch. Veterinary Medicine, Free Univ., Berlin, W. Germany). *Arch. Int. Pharmacodyn. Ther.* 230(2):300-308; 1977.

7352 STRUCTURE-ACTIVITY RELATIONSHIP OF SOME ACETYLENIC-PGE_2 DERIVATIVES. (Eng.) Franceschini, J.; Mizzotti, B.; Ceserani, R.; Mandelli, V.; Usardi, M. M. (Istituto Carlo Erba per Ricerche Terapeutiche, Milan, Italy). *Pharmacol. Res. Commun.* 9(10):899-908; 1977.

7353 HUMAN PEPSINOGENS AND PEPSINS. (Eng.) Samloff, I. M. *In: Pathophysiology of Carcinogenesis in Digestive Organs. Proceedings of the 7th International Symposium of The Princess Takamatsu Cancer Research Fund, Tokyo, 1976.* (Tokyo: University of Tokyo Press): 65-74; 1977.

7354 COMPOUNDS WITH GASTRIC ANTISECRETORY ACTIVITY. 1. PHENOXYALKYLAMINES. (Eng.) Cross, P. E.; Dickinson, R. P.; Kemp, J. E. G.; Leeming, P. R.; Pullman, L. G. (Pfizer Central Res., Pfizer Ltd., Sandwich, Kent, England). *J. Med. Chem.* 20(10):1317-1323; 1977.

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7359 THE INTESTINAL PHASE OF GASTRIC ACID SECRETION IN MAN. (Eng.) Christiansen, J. (Glostrup Hosp., DK-2600 Glostrup, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 13(1):1-2; 1978.

7360 ELECTRICAL EVENTS DURING STIMULATION OF HCl SECRETION BY FROG GASTRIC MUCOSA IN VITRO. (Eng.) Machen, T. E.; Clausen, C.; Diamond, J. M. (Dept. Physiology-Anatomy, Univ. California, Berkeley, CA 94720). *Gastroenterology* 73(4, Part 2): 970; 1977.

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7367 EFFECT OF PHENOLIC ACIDS AND RELATED COMPOUNDS ON GASTRIC ACID SECRETION IN THE RAT. (Eng.) Tani, S. (Faculty Pharmaceutical Sciences, Josai Univ., 1-1, Keyakidai, Sakado-shi, Saitama-ken, 350-02, Japan). *Chem. Pharm. Bull.* 26(1):309-311; 1978.

7368 PREVENTION OF ACUTE GASTRIC ULCERATION IN THE RAT BY CIMETIDINE, A HISTAMINE H_2-RECEPTOR ANTAGONIST. (Eng.) Lee, S. P.; Tasman-Jones, C. (Sch. Medicine, Univ. Auckland, Park Rd., Auckland, New Zealand). *Clin. Exp. Pharmacol. Physiol.* 5(1):61-66; 1978.

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7370 EFFECT OF CYCLO-ALKYL LACTAMIMIDES UPON HUMAN PEPSINS AND PEPSINOGENS. (Eng.) Roberts, N. B.; Taylor, W. H. (Dept. Chemical Pathology, Ashton St., Liverpool L3 5RT, England). *Clin. Sci. Mol. Med.* 54(2):181-185; 1978.

See also, 7278, 7311, 7313, 7320, 7321, 7527, 7537, 7589, 7590, 7607, 7609, 7621.

7371 BIOCHEMICAL STUDIES OF PANCREATIC JUICE COLLECTED BY DUODENAL ASPIRATION AND ENDOSCOPIC CANNULATION OF THE MAIN PANCREATIC DUCT. (Eng.) Escourrou, J.; Frexinos, J.; Ribet, A. (Clinique des Maladies de l'Appareil Digestif, C.H.U. de Rangueil, 31054 Toulouse Cedex, France). *Am. J. Dig. Dis.* 23(2):173-177; 1978.

The collection of pancreatic secretion by a classical duodenal aspiration technique was compared with collection by cannulation of Wirsung's duct under duodenoscopic control in the same seven fasted, healthy subjects. In both cases, the same stimulants were used: 0.5 clinical U/kg/hr of GIH secretin and 75 ng/kg/hr of cerulein, given in a saline chloride infusion over 1 hr. The pH determined to the nearest 1/100 unit was found to be significantly higher ($p<0.05$) in samples collected by cannulation than in samples collected by aspiration. The mean of volumes for every subject showed no significant difference between pure pancreatic juice (PPJ, 104 ± 20.07 ml/30 min) and duodenal aspirate (DA, 103.8 ± 37.53 ml/30 min). However, the variance was greater in the DA (S2=1,645.5) than in the PPJ (S2= 441.8). The bicarbonate concentration in the PPJ (124.51 ± 11.32 mEq/l) was significantly greater than that in the DA (76.14 ± 9.30 mEq/l, $p<0.001$), as was the bicarbonate output (429.4 ± 80.37 versus 260 ± 94.5 µEq/min). There was a linear relation between the weight of the subject and the bicarbonate output measured in the PPJ ($r=0.81$). There was no statistical separation between the mean concentrations and outputs of protein, lipase, chymotrypsin, and amylase determined in the DA and in the PPJ. The results show that, in the normal subject, the collection of pancreatic juice obtained by endoscopic cannulation of the main pancreatic duct is necessary to explore the maximal secretory capacity of water and electrolytes. However, this technique is no better than the present method of duodenal aspiration with stimulation by secretin or cerulein for the exploration of the enzyme secretion.

7372 THE POLAR INTERACTIONS BETWEEN PANCREATIC LIPASE, COLIPASE AND THE TRIGLYCERIDE SUBSTRATE. (Eng.) Borgstrom, B.; Donner, J. (Dept. Physiological Chemistry, Univ. Lund, POB 750, S-220 07 Lund, Sweden). *FEBS Lett.* 83(1): 23-26; 1977.

The type of bonding interaction that occurs between pancreatic lipase and colipase on one hand and the bile salt-laden substrate interface on the other was investigated using porcine and rat pancreatic juice, various triglyceride substrates, and a 2-mM Tris-maleate buffer (pH=7.0) in 1 mM $CaCl_2$ with varying concentrations of NaCl and bile salt. In some cases, the pH of the buffer was varied. In the absence of bile salts, lipase adsorbed completely to the tributyrin (substrate) interface and NaCl (up to 1 M) did not affect the binding. In the presence of bile salt above the critical micellar concentration (4 mM taurocholate), the binding of lipase to tributyrin depended on the salt concentration, the pH of the solution, and the pI of the enzyme. At low salt concentration, rat lipase bound substrate up to pH 7.5 and above 0.6 M NaCl, no binding occurred at any pH. The binding curve over pH shifts to the left as the salt concentration rises, as does the pH optimum for the enzyme. In the absence of NaCl, both lipases bound to three different oil/water interfaces (tributyrin, trioctyl glyceryl ether, hexadecane) to the same extent. Addition of NaCl drove the lipase into the aqueous phase; the NaCl concentration required to accomplish this shift depended on the interface structure, being lowest for hexadecane, higher for the ether, and highest (>0.1 M) for the ester. The adsorption of colipase to tributyrin was unaffected by NaCl (0-1 M) in the absence of bile salt; above 4 mM taurocholate, increasing the NaCl concentration decreased the adsorption with no adsorption occurring at 1 M. When trioctyl glyceryl ether was used in the presence of >4 mM taurocholate at pH 7.0 and 150 mM NaCl, no colipase adsorption occurred. The results demonstrate that polar rather than hydrophobic bonding is important for the attachment of lipase and colipase to their bile salt-laden substrates at the substrate oil/water interface. It is suggested that the specific bonding of these two proteins to their substrates occurs via hydrogen bonds to substrate carbonyl groups.

7373 A STUDY OF THE SYNTHESIS OF DNA, RNA, PROTEIN, AND OXYGEN UPTAKE IN SEGMENTS OF THE RAT PANCREAS. (Eng.) Adams, H. W.; Webster, P. D., III (Medical Coll. Georgia, Augusta, GA). *Am. J. Dig. Dis.* 22(10):898-901; 1977.

To determine whether there is metabolic uniformity among segments of the pancreas, the synthesis of DNA, RNA, and protein and oxygen uptake were studied *in vitro* in the head (parabiliary and duodenal segments), body (gastric segment), and tail (splenic segment) of the pancreas of male Sprague-Dawley rats. There was no significant difference in the DNA content (except that the tail segment averaged 10% less DNA/mg wet tissue than did the body or head, $p<0.05$), RNA content expressed in terms of DNA, or protein content expressed in terms of DNA among the three segments. The rates of DNA synthesis (incorporation of ^{3}H-thymidine), RNA synthesis (incorporation of ^{3}H-uridine), and protein synthesis (incorporation of ^{14}C-phenylalanine) were not significantly different among the three segments, nor was the oxygen

uptake (consumption) in the three segments significantly different. The lower DNA content in the tail of the pancreas suggests that, on a per weight basis, there are fewer cells and more connective tissue or other structural elements in this segment. It is concluded that there is metabolic uniformity in the rat pancreas and that one segment of the pancreas may be considered to be representative of the entire pancreas metabolically.

7374 EFFECT OF PANCREATIC POLYPEPTIDE ON DNA-SYNTHESIS IN THE PANCREAS. (Eng.) Greenberg, G. R.; Mitznegg, P.; Bloom, S. R. (Royal Postgraduate Medical Sch., London W12, England). *Experientia* 33(10):1332-1333; 1977.

A study was carried out in 48 male Sprague-Dawley rats that had been fasted for 24 hr to determine whether pancreatic polypeptide (PP) has any trophic effect in the gastrointestinal tract and to establish whether PP can influence the trophic action of cholecystokinin (CCK). Four groups of 12 rats each received single i.p. injections of NaCl (group I, control), CCK-octapeptide (CCK-OP, 18 nmol/kg, group II), bovine PP (BPP, 12 nmol/kg, group III), or both CCK-OP and BPP (same doses, group IV). After 15 hr, each animal received an injection of 0.5 mCi/kg ^{3}H-thymidine, and all animals were sacrificed at 16 hr and the liver, pancreas, duodenum, and oxyntic area of the stomach examined for incorporation of label. The drugs had no significant effect on DNA synthesis in either the liver or duodenum. In the pancreas, the extent of DNA synthesis was significantly increased by both CCK-OP ($p<0.05$) and BPP ($p<0.01$) compared with the control; BPP did not affect the enhancement elicited by CCK-OP. The extent of DNA synthesis was increased twofold by all three treatments; the level following CCK-OP plus BPP treatment was significantly greater than the control value ($p<0.005$). Although in the duodenum, both CCK-OP, BPP, and the combined drugs enhanced the extent of DNA synthesis 50% compared with controls, the differences did not reach statistical significance. BPP has a trophic effect on the pancreas and duodenum, but it neither augments nor inhibits the trophic action of CCK-OP.

7375 EFFECT OF EXPERIMENTAL HEMORRHAGIC PANCREATITIS ON RESPIRATORY FUNCTION AND PULMONARY PHOSPHOLIPIDS. (Eng.) Dougall, A. M.; Brennan, M. M.; Wong, C. Y.; Harding, P. G. R.; Possmayer, F.; Ahmad, D.; *et al.* (Univ. Hosp., Univ. Western Ontario, London, Ontario, Canada). *Surg. Forum* 28:189-191; 1977.

A study was undertaken to correlate the degradation of pulmonary phospholipids with the deterioration of pulmonary function during acute pancreatitis in dogs. Acute pancreatitis was induced in five dogs by the transduodenal injection of 0.5 ml/kg of autologous bile; controls were sham operated. Normal saline (10 ml/kg/hr, i.v.) was given during the whole 12-hr experiment, during which respiratory function was measured and after which the animals were sacrificed and phospholipids recovered from lung lavages and sera for analysis by two-dimensional thin-layer chromatography. Phospholipase A activity was also determined. Controls demonstrated an improvement in respiratory function over 12 hr, but dogs with pancreatitis suffered a deterioration in function after an initial improvement during the first 8 hr. Lung wash from control dogs contained a greater amount of phospholipid (3.32 ± 0.487 mg/kg body weight) than did lung wash from dogs with pancreatitis (2.11 ± 0.225 mg/kg). The phospholipid composition was similar in both groups (phosphatidyl choline and lysolecithin were 75% and 1.09%, resp., in the control group and 70% and 1.52%, resp., in the experimental group of the total phospholipid) and both components lowered surface tension (in an artificial alveolus machine) to the same degree. Phospholipase A activity was markedly increased in the serum and lung wash of dogs with pancreatitis compared with control dogs. Despite the deterioration of pulmonary function in acute pancreatitis, degradation of pulmonary phospholipids is not detected. Elevated phospholipase A activity in acute pancreatitis does not alter pulmonary surfactant within the first 12 hr of pancreatitis.

7376 TIME COURSE OF PANCREATIC PROTEIN SYNTHESIS FOLLOWING FEEDING. (Eng.) Malo, C.; Morisset, J. (Dept. Biology, Sherbrooke Univ., Sherbrooke, Quebec J1K 2R1, Canada). *Am. J. Dig. Dis.* 23(1):6-8; 1978.

To establish whether the effects of pancreozymin (PZ) and secretin (SE) on the exocrine pancreas are physiological, the effects of feeding on pancreatic protein synthesis were investigated in male albino Sprague-Dawley rats fasted for 24 hr and then fed five consecutive 1-hr meals of ground rat chow (morning and evening for 2 days plus the 3rd morning). After another 24-hr fast, control rats went unfed but experimental animals were fed for 15 min; rats were sacrificed at 15-min intervals between 15 and 120 min after the last meal. ^{3}H-L-phenylalanine (^{3}H-L-phe, 10 Ci/mmol, 10 µCi) was injected 10 min before sacrifice, and then the pancreas was homogenized for study. The free intrapancreatic ^{3}H-L-phe pool did not change significantly over time. But the incorporation of the radiolabel into protein was significantly reduced ($p<0.001$) 45 min after the end of the meal and significantly increased by 90 min ($p<0.05$) and 105 min ($p<0.02$) after the meal compared with controls. The rate of incorporation returned to the control level by 120 min. The results show that feeding induces variations in total pancreatic protein biosynthesis *in vivo*; these variations are similar to those previously observed with PZ and SE, indicating that the changes observed following hormonal stimulation are physiological.

7377 SOMATOSTATIN THERAPY OF ACUTE EXPERIMENTAL PANCREATITIS. (Eng.) Lankisch, P. G.; Koop, H.; Winckler, K.; Folsch, U. R.; Creutzfeldt,

W. (Dept. Medicine, Univ. Gottingen, Gottingen, W. Germany). *Gut* 18(9):713-716; 1977.

Because somatostatin (SRIF) reduces exocrine pancreatic secretion, its effect on acute experimental pancreatitis was investigated in the rat. Acute pancreatitis was induced in 45 male Wistar rats by the retrograde injection of 0.6 ml of 0.8, 2.0, or 3.0% Na-taurocholate into the pancreatic ducts; linear SRIF was given s.c. during the operation as a 200-µg bolus and by infusion (100 µg/100 g body weight) for 3 hr after, while controls received saline infusions. Rats were sacrificed 1 hr after treatment was stopped. SRIF therapy significantly lowered the serum lipase levels in all three groups ($p<0.05$ for 0.8 and 3%, $p<0.001$ for 2%) and the serum amylase level in the 0.8% group ($p<0.02$). Ascites amylase and lipase and pancreatic amylase and trypsin levels as well as the degree of pancreatic necrosis, edema, and WBC count were not affected by SRIF. When the same protocol was used to induce 2%, 2.5%, or 3% Na-taurocholate pancreatitis in 56 rats, all rats (SRIF-treated and control) in the 3% group died within 20 hr, 50% of the treated and 50% of the control rats survived in the 2.5% group, and 73% of the treated and 75% of the control rats survived in the 2% group. SRIF does not appear to be effective in the treatment of acute pancreatitis.

7378 INHIBITORY EFFECT OF SOMATOSTATIN ON HUMAN PANCREATIC POLYPEPTIDE SECRETION. (Eng.) Marco, J.; Hedo, J. A.; Villanueva, M. L. (Clinica Puerta de Hierro, Universidad Autonoma, Madrid, Spain). *Life Sci.* 21(6):789-791; 1977.

The effect of somatostatin on the secretion of human pancreatic polypeptide (HPP) was investigated in five patients who had undergone subtotal gastric resection with Billroth I or Billroth II reconstruction due to benign ulcer disease. Overnight fasted patients underwent an oral glucose tolerance test (OGTT) during which plasma HPP levels were determined. Glucose (1.75 g/kg) was taken 60 min after starting a somatostatin (9 µg/min after an initial 250 µg bolus) or saline infusion; the entire test lasted 3 hr. The mean fasting plasma HPP level was 65 ± 10 pg/ml. Glucose ingestion during saline infusion caused a prompt elevation of the plasma HPP level ($p=0.02$, $p=0.01$, $p=0.006$, and $p=0.01$ at 10, 15, 20, and 30 min, resp.). When somatostatin was infused, the plasma HPP level was depressed compared with the basal level ($p=0.0007$-0.005), and the HPP response to p.o. glucose was completely abolished. These results demonstrate that somatostatin is a potent inhibitor of pancreatic polypeptide secretion in man.

7379 EXOCRINE PANCREATIC RESPONSE TO THE VENOM OF THE SCORPION, Tityus trinitatis. (Eng.) Bartholomew, C.; Murphy, J. J.; McGeeney, K. F.; Fitzgerald, O. (General Hosp., Port-of-Spain, Trinidad, West Indies). *Gut* 18(8):623-625; 1977.

Because acute pancreatitis has been reported after the sting of the scorpion, *Tityus trinitatis*, the effect of its venom on exocrine pancreatic secretion was investigated in dogs. A dose of 1 mg/kg venom usually stimulated pancreatic volume, amylase, lipase, and trypsin output. In one dog receiving this dose, pancreatic output was increased from a basal level of 0.42 ml to 0.92 ml, and the amylase, lipase, and trypsin levels increased from 0.6 Kallikrein Units (KU) to 10.7 KU, from 47.7 KU to 198 KU, and from 4.1 mg to 16.7 mg, resp. The pancreatic response of one dog to serial injections of venom (1.0 mg/kg) produced an increasing rate of enzyme secretion with repetition of the stimulus. In another dog, venom was administered during a continuous secretin infusion (16 U/hr, i.v.). A very slight increase in volume resulted, but the enzyme output increased from 0.3 KU to 2.8 KU amylase. The concentration of the secreted enzyme increased from 0.15 KU to 1.1 KU/ml. The results indicate that venom from *T. trinitatis* evokes enzyme-rich pancreatic secretion.

7380 OLEATE INHIBITS EXOCRINE PANCREATIC SECRETION [Letter to Editor]. (Eng.) Voirol, M.; Capitaine, Y.; Rosenbusch, C. A.; Loizeau, E. (Clinique Universitaire de Medicine Interne H.C., CH 1211 Geneva, Switzerland). *Lancet* 1(8058):274; 1978.

7381 ACTION OF INTRADUODENAL OLEIC ACID ON THE PANCREATIC EXOCRINE SECRETION OF CHRONIC ALCOHOLIC RATS: A FOLLOWED STUDY DURING 1 YEAR [Abstract]. (Eng.) Laugier, R.; Sarles, H. (INSERM U-31, 46 chemin de la Gaye, 13009 Marseille, France). *Digestion* 16(1/2):213; 1977.

7382 EFFECT OF GLUCAGON ON DIGESTIVE ENZYME SECRETION FROM ISOLATED PANCREATIC ACINAR CELLS [Abstract]. (Eng.) Singh, M. (Veterans Admin. Hosp., Augusta, GA 30904). *Fed. Proc.* 37(3):809; 1978.

7383 THE HYPOCALCEMIC EFFECTS OF PANCREATIC HOMOGENATES [Abstract]. (Eng.) Appert, H. E.; Nakashima, Y.; Howard, J. M. (Medical Coll. of Ohio, Toledo, OH 43699). *Fed. Proc.* 37(3):810; 1978.

7384 CHARACTERISTICS OF AN IN SITU ISOLATED AND PERFUSED RAT PANCREAS [Abstract]. (Eng.) Lanoe, J.; Lalande, M.; Morisset, J. (Gastrointestinal Res. Unit, Univ. Sherbrooke,

Sherbrooke, Quebec J1K 2R1, Canada). *Fed. Proc.* 37(3):809; 1978.

7385 THE EFFECT OF CHRONIC ADMINISTRATION OF D-PENICILLAMINE ON THE RAT PANCREAS [Abstract]. (Eng.) Argent, B. E.; Case, R. M.; Smith, P. A.; Sunter, J. P. (Univ. Medical Sch., Newcastle upon Tyne NE1 7RU, England). *Br. J. Pharmacol.* 61(1):120P-121P; 1977.

See also, 7311, 7321, 7322, 7336, 7437, 7453, 7458, 7480, 7751, 7764, 7770, 7779.

SECRETION AND METABOLISM

Hepatobiliary Tract

7386 HEPATIC VENOGRAPHY OF NORMAL AND REGENERATING DOG LIVER. (Eng.) Enge, I.; Flatmark, A.; Bergan, A. (Rikshospitalet, Oslo 1, Norway). *Scand. J. Gastroenterol.* 13(1):27-32; 1978.

Total and selective hepatic vein angiographies were performed preoperatively and 6 weeks after 70% liver resection in six mongrel dogs to study the hepatic vein system in the normal and regenerating liver. After 6 weeks, the dogs were sacrificed for postmortem studies. At 6 weeks postoperatively, total hepatic venography revealed 3-5 remaining visible lobar veins, the inferior vena cava, 1 or 2 phrenic veins, and the renal veins. The inferior vena cava was sometimes slightly displaced to the left. In one dog, a moderate but constant narrowing of the inferior vena cava at the level of the diaphragm was seen. The diameter of the lobar veins and their major tributaries were increased compared with preoperative studies, and the lobar veins were elongated and distributed to a larger mass of hepatic tissue. The larger subdivisions of the lobar veins were given off at strikingly larger angles. Selective lobar vein angiography more distinctly visualized the smaller peripheral tributaries in the lobes and showed them to be similar to the preoperative state. At autopsy, the residual livers were all of the same shape, with the right lateral and caudate lobes obviously increased in size and with thickened, rounded margins, and the regenerated liver weight was 100-108% of the calculated preoperative weight. Except for a few small veins emptying directly into the inferior vena cava, the hepatic vein anatomy may be evaluated by these angiographic methods. The results are consistent with previous findings. The increased diameter of the lobar veins is probably due to increased blood flow, the elongation of the vessels and increased angle between the vein radicles to the diffuse growth of the liver remnants, and the narrowing of the inferior vena cava in one dog to the surgical procedure.

7387 STUDIES ON SYMPATHETIC INNERVATION OF THE HEPATIC VASCULATURE. (Jpn.) Yamamoto, K. (Kumamoto Univ. Medical Sch., Kumamoto, Japan). *J. Kumamoto Med. Soc.* 51(2):73-89; 1977.

To study sympathetic innervation of the hepatic vasculature, the distribution of norepinephrine fluorescence (NAF) was studied in hepatic arteries and veins of the dog, rabbit, guinea pig, rat, and mouse. Adrenergic receptors were studied in perfused livers by adding sympathetic amines and their blockers to the perfusate. NAF distribution was similar in all species examined. NAF was present in the layer between the adventitia and the media of the intrahepatic artery and the portal vein. NAF was not detected in the hepatic lobuli, including the area adjacent to the central vein. Most of the NAF in the hepatic vein was located in the media, with a small amount in the adventitia. NAF content of the hepatic vasculature was markedly increased after norepinephrine treatment. NAF was markedly decreased after the administration of reserpine. NAF decreased in the hepatic artery and portal vein following periarterial neurectomy in the hepatic hilus or celiac ganglionectomy in rats and dogs, whereas hepatic vein NAF remained unchanged. In perfused canine livers, there was a significant change in flow rate in both the hepatic artery and the portal vein within 30 min of the addition of phenylephrine or isoproterenol to the perfusate. The effects of these drugs were suppressed by phenoxybenzamine or propranolol pretreatment. In the hepatic artery, the flow rate decreased within 30 min of the addition of norepinephrine; this was followed by an increase in the next 30 min of perfusion. Phenoxybenzamine treatment prior to norepinephrine treatment increased the flow rate, whereas propranolol pretreatment decreased the flow rate in the hepatic artery. The flow rate remained unchanged in the portal vein. The results indicate that adrenergic nerve terminals are located between the adventitia and the media of the hepatic artery and portal vein and in the media of the hepatic vein. Alpha- and beta-adrenergic

receptors are present in the hepatic artery and the portal vein.

7388 SULFOBROMOPHTHALEIN AND INDOCYANINE GREEN BINDING BY THE HEPATIC CYTOPLASMIC PROTEINS. (Eng.) Namihisa, T.; Nambu, M.; Yamashiro, Y. (Juntendo Univ., Sch. Medicine, 1-1 Hongo 2-chome, Bunkyo-ku, Tokyo, 113 Japan). *Gastroenterol. Jpn.* 12(6):466-468; 1977.

BSP and indocyanine green binding by hepatic cytoplasmic proteins was examined by G-100 Sephadex gel filtration in liver specimens from normal humans, from patients with Rotor's hyperbilirubinemia or the Crigler-Najjar syndrome, and from Wistar rats. In the rat, three peaks, designated X, Y, and Z proteins, were prominent, and preferential localizations of BSP and ICG binding to these proteins were demonstrated. In the human liver, BSP localized to Y protein could hardly be demonstrated, whereas ICG binding was detected. The pattern in the tissues from patients with hyperbilirubinemia or the Crigler-Najjar syndrome was similar to that in the normal subjects. These results suggest that the impaired hepatic organic anion transport in congenital hyperbilirubinemia is probably not related to cytoplasmic organic anion binding proteins.

7389 THE METABOLIC INTEGRITY OF HEPATOCYTES IN SUSTAINED INCUBATIONS. (Eng.) Dickson, A. J.; Pogson, C. I (Biological Lab., Univ. Kent, Canterbury, Kent CT2 7NJ, England). *FEBS Lett.* 83(1):27-31; 1977.

To produce a biochemically verified viable preparation of nondividing parenchymal cells that can be maintained in incubation for 8-12 hr to study hepatic anabolism, the biochemical stability of isolated rat parenchymal hepatocytes incubated in Eagle's minimum essential medium with fetal calf serum (medium B) was studied. The results were compared to those obtained from the same cells incubated with Krebs-Henseleit bicarbonate with bovine serum albumin (medium A). Gluconeogenesis from lactate and ATP content were used as measures of metabolic integrity. Gluconeogenic capacity in hepatocytes from 48-hr starved rats decreased rapidly during a 4-hr incubation in medium A, and this decrease correlated with a decreased hepatocyte ATP content; the decreased ATP content was also found using fed-rat hepatocytes and had a half-life of 2-5 hr. Storage of the cell preparations on ice slowed the metabolic deterioration by 300%. Addition of various substrates, hormones, soybean trypsin inhibitor, and collaginase antibody to medium A did not retard the observed hepatocyte deterioration. However, when hepatocytes were incubated in medium B, the ATP content was maintained for 8 hr of incubation and even at 16 hr was 2.5 times greater than in cells incubated in medium A. The initial cellular activities of lactate dehydrogenase and the ratio of lactate to glutamate dehydrogenases were similar in cells incubated in both media, but the subsequent leakage of lactate dehydrogenase into the medium was greatly retarded in medium B. Although cellular K^+ content was maintained in both media A and B, that of cells in medium B was higher throughout. The results indicate that isolated hepatocytes can be maintained in physiological states for up to 8 hr with little alteration in viability and that medium B appears to be the medium of choice.

7390 BIOCHEMICAL AND ULTRASTRUCTURAL EVALUATION OF ISOLATED RAT LIVER SYSTEMS PERFUSED WITH A HEMOGLOBIN-FREE MEDIUM. (Eng.) Sugano, T.; Suda, K.; Shimada, M.; Oshino, N. (Dept. Veterinary Physiology, Coll. Agriculture, Univ. Osaka Prefecture, Sakai, Osaka 591, Japan). *J. Biochem.* 83(4):995-1007; 1978.

To determine the viability of isolated rat livers perfused with a hemoglobin-free medium devoid of albumin, ultrastructural evaluation and quantitative measurement of several hepatic functions were made in anesthetized male Sprague-Dawley rats perfused in a flow-through mode. The perfusion medium was a mixture of 115 mM NaCl, 5.9 mM KCl, 1.2 mM $MgCl_2$, 1.2 mM NaH_2PO_4, 1.2 mM Na_2SO_4, 2.5 mM $CaCl_2$, and 25 mM $NaHCO_3$. The effect of flow rate on oxygen consumption and changes in the respiratory rate were studied. Ultrastructural changes indicative of liver injury were sought along with changes in metabolism or hormonal response. When the perfusion flow rate was maintained between 3 and 3.5 ml/min/g of liver, all the biochemical parameters measured in the perfused liver system (the rates of glucose, pyruvate, and lactate production, the rate of oxygen consumption, and the tissue contents of adenine nucleotides) were similar to those observed in perfusion systems containing erythrocytes or albumin. Electron microscopy confirmed adequate preservation of fine structure in all parts of the liver for at least 70 min of perfusion at the flow rate of 3-3.5 ml/min. Hormonal responses demonstrated the operation of integral liver functions in the perfused liver under the experimental conditions. The viability of liver perfused in the hemoglobin- and albumin-free system was confirmed, and this system was found to be equivalent to macromolecule-containing and complex perfusion systems provided an adequate flow rate was employed. The hemoglobin-free system allows analysis by various physicochemical techniques and allows continuous measurement of various parameters. The use of the flow-through mode of perfusion will open a variety of biochemical approaches to the study of hepatic metabolism.

7391 EFFECTS OF PORTACAVAL END-TO-SIDE ANASTOMOSIS ON THE LIVER OF RATS. (Ger.) Rasenack, U.; Grun, M.; Liehr, H. (Medizinische Univ.-Klinik Wurzburg, Josef-Schneider-Str. 2, D-8700 Wurzburg, W. Germany). *Z. Gastroenterol.* 15(11): 680-690; 1977.

The effect of portacaval end-to-side anastomosis on the liver was studied in 117 young rats (liver weight 9.9 ± 1.6 g) and in 33 old rats (liver weight 19.5 ± 1.9 g) and compared with the condition of

the liver in 48 sham-operated male Chbb rats. The weight of the liver of the young rats decreased to 7.5 ± 1.7 g 3 days after the operation; the hepatic atrophy was also accompanied by a reduction of the body weight. The cell necrosis of the hepatic parenchyma was most intense during the first 2 weeks, especially during the 2nd and 3rd days after operation. Complete necrosis of the hepatic epithelium and of the reticuloendothelial system was seen in the old rats 48 hr after operation. No particular changes were seen in the livers of the sham-operated rats. Less marked necrosis of individual cells or cell clusters was seen in both groups even after 5-8 months, at a time when endotoxinemia was detected in 85% of the animals by the Limulus test. Loss of glycogen on the peripheries of the lobules and varying degrees of hemosiderosis were seen several months after operation. The atrophic and necrotic alterations seen immediately after operation were due to hemodynamic disorders, because the hepatic artery, although dilated to the maximum, was unable to compensate for the decrease in the portal blood flow. The late necrotic changes were, however, due to endotoxinemia rather than to persisting hemodynamic disorders.

7392 EXPERIMENTAL STUDIES ON HEPATIC HEMODYNAMICS AND FUNCTION IN POSTSINUSOIDAL BLOCK. (Eng.) Kawabe, K.; Yokota, T.; Mizumoto, R.; Honjo, I. (Faculty Medicine, Kyoto Univ., Sakyo-ku, Kyoto, 606, Japan). *Arch. Jpn. Chir.* 46(5):551-562; 1977.

Hemodynamic changes and liver function were investigated in post- and presinusoidal block in 47 adult mongrel dogs. There were two treatment groups; in group 1, the right branches of the portal vein and the left hepatic vein were ligated to produce presinusoidal block in the right half and postsinusoidal block in the left half of the liver and in group 2, the left hepatic vein was constricted with tape before construction of the portacaval anastomosis. In both acute and chronic (8 weeks after operation) experiments, there was reversed flow from the left half of the liver into the portal vein in group 1. The ratio of blood flow per gram of liver in the right to that in the left half was 1:0.602 in the acute experimental group and 1:0.984 in normal dogs ($p<0.05$). In the chronic group, the hepatic artery flow was the same in the left and right halves, indicating a return to normal flow after the initial acute block. In group 1, the ratio of bile flow from the right to that from the left half of the liver in both acute and chronic conditions showed no significant difference. In the acute tests, there was no difference in BSP excretion between the two liver sections; in the chronic group, however, BSP excretion from the liver lobes with postsinusoidal block was significantly reduced ($p<0.05$). There was severe damage (necrosis and vacuolar degeneration) to the left half of the liver but few changes in the right half in group 1 after 8 weeks. There was little damage to liver cells and no fibrosis in group 2 dogs. In dogs from group 2, the arterial blood entering the left half of the liver flowed out partly via the constricted hepatic vein and partly via the portal vein in a reversed flow. These results indicate that liver function may decrease due to the ineffectiveness of the hepatic artery reversed flow even when the liver cells show only mild changes.

7393 THE DEMONSTRATION OF PHARMACOLOGICALLY ACTIVE SUBSTANCES IN THE PORTAL VEIN BLOOD OF DOGS AFTER THE LIGATION OF THE SUPERIOR MESENTERIC ARTERY. (Ger.) Wedell, J.; Schmutzler, W.; Kayser, D. (Chirurgische Klinik, Kreiskrankenhaus, D-4900 Herford, W. Germany). *Langenbecks Arch. Chir.* 344(2):131-140; 1977.

The effect of ligation of the superior mesenteric artery on the concentrations of pharmacologically active substances (serotonin, kinins, catecholamines, histamine, and prostaglandin-$F_{2\alpha}$) in the portal vein blood was studied in male and female dogs. The serotonin concentration increased from 0.932 ng/ml in the controls to 0.94 ng/ml during the ligation, and from 0.72 to 5.12 ng/ml during the reopening of the occluded artery. During occlusion, the catecholamine concentration was 0.83 ng/ml versus 0.41 ng/ml in the controls; during reopening, the concentrations were 0.33 ng/ml in the controls, and 0.37 ng/ml in the experimental animals. The kinin concentrations were 0.02 and 0.01 ng/ml in the controls during occlusion and reopening, resp.; the corresponding levels in the experimental animals were 0.064 and 0.04 ng/ml. The histamine levels were 11.5-16.5 ng/ml during occlusion and 11.8-14.3 ng/ml during reopening in the control animals versus 14.5-14.7 ng/ml and 14.8-15.5 ng/ml, resp., in the experimental group. The prostaglandin level was increased only immediately after the occlusion and the reopening of the superior mesenteric artery. While the additive effect of the subthreshold concentrations of these substances cannot be excluded, the measured concentrations in the portal vein blood were too low to be responsible for the development of peptic erosions of the stomach as observed after occlusion of the superior mesenteric artery.

7394 THE EFFECT OF ACUTE ETHANOL ADMINISTRATION ON PHOSPHORYLETHANOLAMINE UPTAKE AND METABOLISM IN RAT LIVER SLICES. (Eng.) Corazzi, L.; Arienti, G.; Tirillini, B.; Arienti, U. G.; Porcellati, G.; Orlando, P. (Medical Sch., 06100 Perugia, Italy). *Farmaco (Sci.)* 32(8):614-621; 1977.

The possibility that phosphorylethanolamine (PE) is incorporated into liver phospholipids in both normal and acutely ethanol-intoxicated female Wistar rats was investigated using an *in vitro* assay employing liver slices and both ^{14}C-PE and ^{32}P-PE. Experimental and control rats were fasted for 12 hr, then received either 50% ethanol (6 g/kg, single p.o. dose) or 0.9% saline (7.5 mg NaCl/100 g, single p.o. dose), and were sacrificed 8 hr later. Triacylglycerols accumulated in the livers of ethanol-treated rats (8.19 ± 0.90 µmol/g tissue) compared with controls (3.85 ± 0.56 µmol/g). The ratio of $^{32}P:^{14}C$ in PE in the liver was very close to 1 (the theoretical value) after 10-15 min of labeling (and was no less than 0.66 after 60 min), indicating

that PE was not hydrolyzed before uptake by liver cells; the ratio was similar at each time point in treated and control animals, indicating no significant differences in uptake between the two groups. Some of the PE was hydrolyzed to free ethanolamine (EA) and orthophosphate, the hydrolysis being less pronounced in the treated rats (77.89 ± 17.35 and 117.57 ± 26.69 nCi labeled EA/g tissue in treated and control rats, resp.). Ethanolamine glycerophospholipids (EPG) were strongly double-labeled to similar extents in both treated and control rats; the labeling ratio was very high initially (0.83 in both groups after 10 min of labeling) and fell to 0.47 and 0.37 in treated and control rats, resp., after 60 min of labeling, indicating that PE was incorporated into EPG without being hydrolyzed. After the longer incubation times (30-60 min), choline phosphoglycerides (CPG) were also found to be labeled, indicating that some EPG were methylated into choline compounds (at 60 min, about 20% of total lipid radioactivity in the liver was confined to (CPG). It is concluded that PE is taken up as such into liver cells and is incorporated into EA and CPG in both normal and ethanol-intoxicated rats.

7395 IN VIVO SIGNIFICANCE OF THE MICROSOMAL ETHANOL OXIDIZING SYSTEM (MEOS). (Eng.) Khanna, J. M.; Kalant, H. (Dept. Pharmacology, Univ. Toronto, Toronto, Ontario M5S 1A8, Canada). *Adv. Exp. Med. Biol.* 85A:281-302; 1977.

Studies on the *in vivo* significance of the microsomal ethanol oxidizing system (MEOS) are reviewed. There were no significant differences between alcohol-naive rats treated with CCl_4 (which decreases MEOS activity) and controls in the disappearance rate of ethanol from the whole body or the blood, suggesting that MEOS does not play a significant role in ethanol metabolism *in vivo* in the naive rat. The results of tests using rats pretreated with phenobarbital or chlorcyclizine, inducers of drug metabolism, support this conclusion. In these tests MEOS activity was significantly increased, but there was no difference in the ethanol metabolism rate in treated rats. The chronic administration of ethanol in a high fat, adequate protein diet resulted in a significant increase in MEOS activity but had no effect when given with a high protein, low fat diet. However, chronic treatment of rats with either type of ethanol-containing diet resulted in a significant increase in ethanol metabolism, also indicating that changes in MEOS are not related to changes in ethanol metabolism. Determination of the cytoplasmic and mitochrondrial NAD/$NADH_2$ ratios in rats treated chronically with ethanol indicates that an adaptive increase in the mitochondrial reoxidation of NADH in the chronic alcohol-treated rat leads to an increase in the ethanol oxidation rate. There is a marked variability in the inductive effect of ethanol on drug metabolism. In some cases (meprobamate) there is an increase in inducibility after chronic ethanol treatment, while in others (pentobarbital) there is no effect. Studies of the acute interaction between ethanol and drugs suggest that ethanol modifies the conformation of the microsomal hemoprotein, impairing its ability to carry out the drug hydroxylation reaction. The rate of ethanol metabolism was independent of dose (0.5, 1.0, 2.0, and 4.0 g/kg, i.p.) but was inhibited 83%-92% in all dose groups by 4-methylpyrazole (2 mmol/kg). These studies fail to support the existence of a non-ADH-mediated pathway of ethanol elimination in the rat. It is concluded that changes in MEOS activity bear no consistent relationship to ethanol metabolism.

7396 LIVER MONOAMINE OXIDASE (MAO) IN LIVER HOMOGENATE OF MICE INFECTED WITH Schistosoma mansoni AND EFFECT OF CERTAIN THERAPEUTIC AGENTS. (Eng.) Samad, M. M. A.; Guirgis, F. K.; Zeitoun, R.; El-Feki, R. F.; Awadalla, H. N. (Faculty Medicine, Alexandria Univ., Alexandria, Egypt). *Tropenmed. Parasitol.* 28(4):554-559; 1977.

To determine whether measurements of monoamine oxidase (MAO) activity can be useful in assessing the degree of liver fibrosis and its progression with time or its reversal after treatment in hepatosplenic schistosomiasis, MAO activity in liver homogenates of mice infected with *Schistosoma mansoni* was determined from the 2nd to the 14th week following infection. In control animals, MAO activity ranged from 3.96 ± 0.64 to 4.52 ± 0.39 U. In infected animals there was a sharp and significant increase in MAO activity during the 2nd and 3rd week after infection (6.20 ± 0.72 and 6.22 ± 0.25 U, resp., $p<0.01$). The enzyme activity began to decrease at the 6th week (3.94 ± 0.62 U) and reached 0.68 ± 0.22 U ($p<0.01$) at the 8th week after infection. By the 14th week, the level had risen again to 3.38 to 0.73 ($p<0.05$) but the percentage decrease was still significant when compared to the control. Animals were given four different treatment regimens and sacrificed 2 hr after drug administration and at the 1st, 3rd, and 8th days following treatment. Tartar emetic (30 mg/kg i.p. for 5 days) produced a nonsignificant increase in MAO activity in the infected mice, but caused no change in the normal group. Stibophen (300 mg/kg i.p. for 5 days), niridazol (50 mg/kg p.o. for 5 days), and hycanthone (35 mg/kg i.m.) all caused significant increases in MAO activity of infected mice ($p<0.01$ or $p<0.05$, $p<0.01$, and $p<0.01$, resp.). Stibophen and hycanthone caused no significant changes in liver MAO activity of normal mice; niridazole caused a transient but significant ($p<0.05$) increase in MAO activity at 3 hr after the last dose. The increase in the liver MAO activity of treated mice indicates that the livers of these mice are returning to normal and that the formation of new fibrous tissue has stopped. Measurement of MAO activity can be a useful index for the progression or regression of liver fibrosis in bilharzial hepatosplenomegaly.

7397 PORPHOBILINOGEN OXYGENASE INDUCTION BY 2-ALLYL-2-ISOPROPYLACETAMIDE TREATMENT. (Eng.) Tomaro, M. L.; Frydman, R. B. (Faculdad de Farmacia y Bioquimica, Universidad de Buenos Aires, Junin 956, Buenos Aires, Argentina). *FEBS Lett.* 84(1):29-32; 1977.

The effect of 2-allyl-2-isopropylacetamide (AIA) administration on 5-aminolevulinic acid synthetase (ALA-synthetase) and porphobilinogen-oxygenase (PGB-oxygenase) metabolism was studied in rats. Female Wistar rats fasted for 24 hr received a s.c. injection of AIA (250 mg/kg). ALA was present in urine collected 24 hr after AIA administration, and maximum excretion occurred between 24 and 48 hr after injection (120 ± 14 nmol). No ALA excretion was present between 48 and 72 hr. PBG was excreted only between 24 and 48 hr (146 ± 11 nmol). Microsomal PBG-oxygenase activity in the AIA-treated rats increased simultaneously with ALA and PBG excretion and reached a maximum 48 hr after the AIA treatment. No significant difference in PBG-oxygenase activity between the control and the treated rats was found 74 hr after the AIA treatment. The higher values of ALA-synthetase activity were found in the livers excised 24 hr after the AIA treatment, while in those excised 48 hr after the treatment, the values were almost normal. To examine if ALA or PBG, or both together, are involved in the observed PBG-oxygenase induction, they were administered to rats, and oxygenase activity was examined. Six-hour urine samples from rats treated with ALA (4, 8, and 12 mg/kg, s.c.) contained 90% of all the excreted ALA and PBG formed at expense of the injected ALA, in a 7:10 ratio of ALA:PBG. No significant increase of PBG-oxygenase activity over control was detected in ALA-treated animals. When ALA (8 mg/kg) and PBG (4 mg/kg) were administered together, similar results were obtained. About 30% of the injected porphyrin precursors were recovered in the urine samples. These data suggest that the sequential induction of ALA-synthetase and PBG-oxygenase might involve a metabolic response to the problem of excessive PBG formation.

7398 UDP-GLUCURONYLTRANSFERASE IN PERFUSED RAT LIVER AND IN MICROSOMES: V. STUDIES WITH GUNN RATS. (Eng.) Bock, K. W.; Clausbruch, U. C. V.; Ottenwalder, H. (Inst. Pharmacology and Toxicology, Univ. Gottingen, D-3400 Gottingen, W. Germany). *Biochem. Pharmacol.* 27(3):369-371; 1978.

To explore the consequences of altered enzyme constraint for glucuronide synthesis by intact tissue, 1-naphthol glucuronidation in perfused livers and in liver microsomes from Gunn rats was studied and compared with that in Wistar rats. The formation of 1-naphthol glucuronide and sulfate was found to be similar, and similar levels of 1-naphthol glucuronide (0.2 μmol/g tissue) and of UDP-glucuronic acid (0.3-0.4 μmol/g tissue) were found in liver tissue of both strains at the end of the perfusion experiments. The level of UDP-glucuronyltransferase (UDPGT) was markedly decreased in Gunn rat microsomes with and without activation (0.7 ± 0.1-14.6 ± 2.5 nmol/min/mg protein) compared with Wistar rat microsomes (1.5 ± 0.4-50.1 ± 9.7 nmol/min/mg protein). The solubilized Gunn-rat enzyme appeared to be less stable upon storage than was the corresponding enzyme preparation from Wistar rats. These findings could be explained by assuming either a defective enzyme and/or abnormal phospholipid enzyme interactions in the Gunn rat with glucuronide synthesis sustained by compensatory activation of the latent enzyme. In both Gunn and Wistar rats, such activation was detected in the liver microsomes using bilirubin, but in perfused Wistar rat livers, 7 μmol of bilirubin caused no activation and 43 μmol decreased 1-naphthol glucuronide synthesis to about 70% of normal. UDPGT activity was markedly induced in the microsomes of Wistar rats by 3-methylcholanthrene (specific activity increased about fivefold), but Gunn rat microsomes were unresponsive. UDPGT activity was inducible to the same extent (about twofold) in both strains by phenobarbital. When morphine and chloramphenicol were used as substrates instead of 1-naphthol, microsomal UDPGT activity was similar in both Gunn and Wistar rats both in basal enzyme level (7 ± 2 and 1.0 ± 0.2 nmol/min/mg protein, resp.). These results support the hypothesis that the markedly decreased UDPGT activity (1-naphthol as substrate) in the Gunn rat does not lead to impaired glucuronide formation in perfused livers probably due to compensatory activation of the latent enzyme.

7399 REGULATION OF HEPATIC DRUG METABOLISM BY ELAIDIC AND LINOLEIC ACIDS IN RATS. (Eng.) Hietanen, E.; Hanninen, O.; Laitinen, M.; Lang, M. (Dept. Physiology, Univ. Koupio, P.O. Box 138, SF-70101 Kuopio 10, Finland). *Enzyme* 23(2):127-134; 1978.

To elucidate the actual role of individual lipid components in the activation of hepatic drug metabolism, the effect of elaidic and linoleic acids on microsomal hydroxylation and glucuronidation reactions was studied in male Wistar rats. The rats were fed a fat-free diet and had elaidic or linoleic acid in doses of 40 and 200 mg/kg injected i.p. every other day for 4 weeks. The rats were then sacrificed and measurements, including body and liver weights and protein, phospholipid, and cholesterol contents of hepatic microsomes (native and trypsin-treated), were made. Pretreatment with either elaidic or linoleic acid altered the fatty acid composition of microsomal phospholipids and decreased the hepatic aryl hydrocarbon hydroxylase and *p*-nitroanisole O-demethylase (PNOD) activity in test rats compared with controls. The UDP-glucuronosyltransferase (UDP-GT) activity was lowered 20% by both acids at both doses compared with controls when *p*-nitrophenol was used as an aglycone; trypsin digestion did not reveal any latent changes in the UDP-GT activity. At the 40 mg/kg dose, linoleic acid-treated rats had significantly ($2p<0.01$) higher body weights than did controls. At 200 mg/kg of linoleic acid, a nearly significant ($2p<0.05$) decrease in body weight was noted. At the higher dose level, linoleic acid produced a nearly significant ($2p<0.05$) decrease in the amount of microsomal protein (both native and trypsin-treated). The activity of microsomal NADPH cytochrome c reductase and microsomal cytochrome P-450 contents were decreased by the higher dose of linoleic acid. Elaidic acid-treated rats had a slightly higher body weight than did controls, and the 200 mg/kg dose decreased the PNOD activity by about 60%, suggesting high sensitivity of this enzyme to elaidic acid. The experiments show that i.p.-administered fatty acids decrease the activities

of mixed-function oxygenase enzymes as well as the UDP-GT activity, possibly by changing the phospholipid component in the microenvironment of membrane-bound enzymes. The changes are dependent on the fatty acid dose and may be enzyme specific.

7400 INHIBITION OF HEPATIC METABOLISM OF AZATHIOPRINE IN VIVO. (Eng.) Kaplowitz, N.; Kuhlenkamp, J. (Veterans Admin. Wadsworth Hosp. Center, Los Angeles, CA 90073). *Gastroenterology* 74(1):90-92; 1978.

To determine whether the hepatic thiolysis of azathioprine mediated by glutathione is enzymatic or nonenzymatic *in vivo*, the effects of probenecid (a glutathione *S*-transferase exogenous inhibitor) and of bilirubin (an endogenous inhibitor) on hepatic azathioprine metabolism were studied in rats. Male Sprague-Dawley rats received azathioprine (100 μmol/100 g) i.p. One group of rats received probenecid (50 μmol/100 g) at 30 and 5 min before azathioprine administration and the controls received saline. Male homozygous Gunn rats received azathioprine, and male Wistar rats served as controls. Azathioprine administration in the Sprague-Dawley rats resulted in 50% depletion of hepatic glutathione content at 5 min and in 80% depletion by 10 min. Probenecid pretreatment caused this depletion to decrease to 22% at 5 min and to 40% at 10 and 15 min ($p<0.001$ for azathioprine plus probenecid versus azathioprine alone at 5, 10, and 15 min). Less hepatic glutathione depletion was also found in hyperbilirubinemic Gunn rats; at 5 and 15 min, only 26% and 40% depletion of hepatic glutathione had occurred, whereas the levels in the controls were 50% and 80% at 5 and 15 min, resp. ($p<0.02$). The findings indicate that the conversion of azathioprine to 6-mercaptopurine *in vivo* is mediated enzymatically by the glutathione *S*-transferases.

7401 COLESTIPOL HYDROCHLORIDE, A NEW HYPOLIPIDEMIC DRUG: A TWO-YEAR STUDY--SUMMARY. (Eng.) Cooper, E. E.; Michel, A. M. (Santa Rosa Medical Center, San Antonio, TX). *Adv. Exp. Med. Biol.* 82:191-194; 1977.

The results of a 2-yr study on the potential use of colestipol hydrochloride as a hypolipemic drug are summarized. A randomized, placebo-controlled, single-blind study was carried out in 152 subjects, among whom 99 hyperlipemic (cholesterol >250 mg/100 ml) patients completed the 2-yr study. Within this group, 60 were treated with colestipol (5 g, t.i.d.), and the others were treated with placebo (Avicel). The serum cholesterol level decreased in the treated subjects from a pretreatment value of 300 mg/100 ml to 250 mg/100 ml after 1 month, to 267 mg/100 ml after 6 months, to 262 mg/100 ml after 1 yr, and to 279 mg/100 ml after 2 yr. The serum cholesterol level changed little in the 39 randomized placebo group. The drug caused no significant side-effects. It is concluded that colestipol hydrochloride effectively depresses cholesterol, but the hepatic synthesis of bile apparently compensates for the lowering of the total bile acid pool; therefore, no lithogenic milieu was produced.

7402 THE EFFECT OF DOPAMINE ON RENAL FUNCTION IN DOGS WITH CHRONIC LIGATION OF THE COMMON BILE DUCT. (Ger.) Benko, H.; Mostbeck, A.; Peschl, L.; Schuller, J.; Neumayr, A. (I. Chirurgischen Universitatsklinik Wien, Vienna, Austria). *Wien. Klin. Wochenschr.* 89(16):562-566; 1977.

The effects of long-term (16-day) ligation of the common bile duct on the glomerular filtration rate (GFR), renal plasma flow (RPF), and urinary sodium excretion were studied in 12 male dogs during dopamine infusion (4 μg/kg/min). Administered before ligation, dopamine caused significant increases in GFR, RPF, and the urinary sodium excretion. Ligation without dopamine had no significant effect on GFR and RPF, but it slightly reduced the urinary sodium clearance. In the dogs with common bile duct ligation, dopamine had no significant effect on GFR and RPF, but it reduced the increase in the urinary sodium clearance from the 222.5% measured before ligation to 62.8%. The findings indicate the possible effectiveness of dopamine treatment in obstructive jaundice with renal failure.

7403 THE EFFECT OF FASTING ON GALACTOSAMINE INDUCED HEPATITIS IN EXPERIMENTAL ANIMALS. (Eng.) Pickering, R. W. (Roussel Lab. Ltd., Kingfisher Drive, Covingham, Swindon, Wiltshire, England). *Arzneim. Forsch.* 27(10):1992-1996; 1977.

Because of the known alterations of metabolic processes during periods of fasting, the effect of fasting on galactosamine hepatitis was studied in male Sprague-Dawley rats and male hamsters fasted for 24 hr. The rats received 500, 1,000, or 1,500 mg/kg of galactosamine i.p. and the hamsters received 200, 400, or 800 mg/kg i.p. before or after fasting in all cases. Liver damage was assessed by determining serum transaminase and liver glycogen levels. Fasting after galactosamine treatment did not alter the course of liver injury in rats. Liver glycogen levels were significantly lower than normal after either fasting or galactosamine treatment alone (1,500 mg/kg) in rats ($p<0.05$) and after galactosamine treatment in hamsters. In rats fasted and treated with galactosamine, the liver glycogen content was significantly higher than that in controls ($p<0.05$). Fasting did not cause any alteration in the reduced liver glycogen level in galactosamine-treated hamsters. Fasting caused no change in the SGOT or SGPT levels in untreated rats. Galactosamine (1,500 mg/kg) caused a significant increase in liver transaminase levels in nonfasted rats, whereas these levels were within normal limits in fasted rats. Galactosamine treatment in unfasted hamsters caused increases in SGOT and SGPT levels, whereas these increases were not seen in hamsters fasted 24 hr prior to galactosamine treatment. Galactosamine hepatitis is modified by previous fasting in rats and hamsters.

7404 EFFECT OF GLUTATHIONE ON THE ACTIVITY OF BILIRUBIN-BINDING PROTEINS FROM RAT LIVER CYTOSOL. (Eng.) Meuwissen, J. A. T. P.; Zeegers, M.; Srai, K. S.; Ketterer, B. (Dept. Medical Res., Katholieke Universiteit Leuven, B-3000 Leuven, Belgium). *Biochem. Soc. Trans.* 5(5):1404-1407; 1977.

The hypothesis that reduced glutathione (GSH) is required to maintain the binding properties of bilirubin-binding proteins in the cytosol was tested by investigating the effects of GSH on the binding of bilirubin by protein components of rat liver cytosol during a zone fractionation. Gel filtration of Gunn rat liver cytosol using Sephadex G-100 yielded three bilirubin-containing fractions. The first, eluted with the void volume, consisted either of colloidal bilirubin or of bilirubin associated with small microsomal fragments. The second and third fractions coincided with ligandin and protein A, resp. Total bilirubin recovery was only 50%, of which the largest part was found at the void volume. If gel filtration was carried out in a GSH-containing buffer, the recovery of bilirubin was complete; none was found at the void volume, and the fraction corresponding to ligandin contained 60-80% of the pigment. Gel filtration of mixtures of Gunn rat liver cytosol and Wistar rat plasma without the addition of GSH, showed that protein A carried the greatest amount of total bilirubin, albumin less, and ligandin the least. In the presence of GSH, ligandin bound the most bilirubin and albumin the least. In neither system was bilirubin found at the void volume. These results show that the binding activity of the ligandin fraction for bilirubin is strongly influenced by GSH. The albumin and the protein A fractions might not be affected; if this is so, they will carry comparatively more of the ligand because of competition with ligandin of decreased affinity. Cytosol proteins bind bilirubin more strongly than does albumin.

7405 BIOTRANSFORMATION AND HEPATOTOXICITY OF HALOTHANE. (Eng.) Brown, B. R.; Sipes, I. G. (Univ. Arizona Coll. Medicine, Tucson, AZ 85721). *Biochem. Pharmacol.* 26(22):2091-2094; 1977.

Literature concerning the mechanism of halothane hepatotoxicity is reviewed. Evidence from animal experiments suggests that the hepatic necrosis produced by this anesthetic could be due to qualitatively and/or quantitatively altered biotransformation of halothane to reactive intermediates, particularly via a reductive or oxygen-deficient pathway. Lipid peroxidation and extensive covalent binding of halothane metabolites may occur, but may be effects, rather than causes. It is possible, but has not been proven, that these new substances could induce a hypersensitivity phenomenon accelerating hepatic cellular destruction. Further investigations into the precise mechanisms and variation of halothane biotransformation should be carried out.

7406 REGULATION OF RAT ALPHA-FETOPROTEIN PRODUCTION BY METHIONINE AND ADENOSINE 5'-TRIPHOSPHATE. (Eng.) Watanabe, A.; Nagashima, H. (Okayama Univ. Medical Sch., 5-1, 2-chome, Shikata-cho, Okayama, Japan). *Res. Exp. Med.* 172(1):71-74; 1978.

Studies were carried out to determine whether a methionine-related metabolic event(s) is related to the repression of alpha fetoprotein (AFP) production seen after birth. The s.c. injection of methionine (2 mg/day) simultaneously with ATP (6.8 mg) and the injection of prednisolone (0.5 mg) both significantly accelerated the rapid fall of serum AFP concentration after birth ($p<0.025$ in both cases) in male and female Sprague-Dawley rats. Separate administration of methionine or ATP produced no similar effect. Serum and small intestinal extracts from adult rats showed similar effects on serum AFP levels, but the changes were not statistically significant. The half-life of AFP in methionine plus ATP-injected animals was almost the same as those in untreated controls, which may suggest that the administration of methionine plus ATP inhibits increased production of AFP or decreases the secretory rate of hepatic AFP into the circulation.

7407 THE METABOLIC EFFECTS OF SODIUM DICHLOROACETATE IN EXPERIMENTAL HEPATITIS IN THE RAT. (Eng.) Johnson, G. A. H.; Alberti, G. M. M. (General Hosp., Southampton SO9 4XY, England). *Biochem. Soc. Trans.* 5(5):1387-1389; 1977.

The hypolactatemic action of dichloroacetate was investigated in experimental liver disease. Liver damage was induced in rats by injecting galactosamine (1 g/kg) i.v. After a 24-hr fast, a basal arterial blood sample was taken, and NaCl (9 g/l, control) or dichloroacetate (300 mg/kg/hr) was infused for 120 min. Galactosamine administration resulted in a mild increase in the blood lactate concentration ($p<0.01$, as compared with that in untreated controls at 0-120 min), whereas the glucose concentration was unchanged. Blood lactate and glucose concentrations were decreased in galactosamine-treated animals, as compared with those in both the controls and those treated with galactosamine alone. For lactate, the differences were significant 30, 60, 90, and 120 min ($p<0.01$, 0.05, 0.01, and 0.01, resp.) when compared with the concentrations in the galactosamine-treated rats. The injection of fructose (1 g/kg, i.v.) in galactosamine-treated animals resulted in a marked increase in blood lactate concentration ($p<0.01$) at 15, 30, 60, and 90 min and in an increase in blood glucose concentration at 15 min ($p<0.01$), when compared with galactosamine-treated rats. The lactate concentrations in rats treated with galactosamine, fructose, or dichloroacetate were also significantly lower than those in rats treated with galactosamine alone ($p<0.01$) at 15-120 min, whereas the glucose concentrations were unaffected. The blood ketone body concentration was unaffected by galactosamine administration, increased by dichloroacetate infusion in galactosamine-treated rats, and decreased by fructose injection in galactosamine-treated rats. Dichloroacetate reverses galactosamine-induced hyperlactatemia and counteracts the effects of

fructose infusion. The effects may be explained by activation of pyruvate dehydrogenase both extrahepatically and in the liver.

7408 COMPARISON OF BILIARY EXCRETORY FUNCTION AND BILE COMPOSITION IN MALE, FEMALE, AND LACTATING FEMALE RATS. (Eng.) Klaassen, C. D.; Strom, S. C. (Univ. Kansas Medical Center, Kansas City, KS 66103). *Drug Metab. Dispos.* 6(2): 120-124; 1978.

The biliary excretion of four xenobiotic drugs that are not biotransformed before excretion was compared to determine whether there are differences in this excretion between male, female, and lactating female rats. The biliary excretion of i.v.-administered phenol-3,6-dibromphthalein disulfonate (DBSP, 100 mg/kg), ^{3}H-ouabain (4 mg/kg), indocyanine green (ICG, 10 mg/kg), and amaranth (200 mg/kg) was studied in Sprague-Dawley rats. The disappearance from the plasma of the four xenobiotics did not differ significantly in male and female rats. The cummulative biliary excretion of DBSP and ouabain was significantly greater ($p<0.05$) in the lactating females. However, the basal bile flow rate in the lactating females was about 50% higher ($p<0.05$) than in the males and nonlactating females. The increase in bile production decreased rapidly after removal of the pups from the dam. It was 74 ± 4 µl/min/kg on day 20 of gestation but only 42 ± 2 µl/min/kg 13 days after parturition. The concentration of phospholipids and cholesterol in the bile of the lactating females was significantly higher ($p<0.05$) than in the bile of the nonlactating females but was similar to that in the bile of the males. The increased bile flow in the lactating females appeared to be due to an increase in canalicular production, since the bile/plasma erythritol concentration ratios were similar in all three groups. Inasmuch as the bile salt concentration did not change in the bile, there appeared to be increases in both the bile salt-dependent and -independent fractions of bile. The increase was due to a more efficient liver rather than to a larger liver, as the weights of the livers (3.8% of body weight) were similar in all three groups.

7409 METABOLISM OF BILE ACIDS IV. ABSORPTION, DISTRIBUTION, EXCRETION, AND METABOLISM OF ORALLY ADMINISTERED URSODEOXYCHOLIC ACID IN RATS. (Eng.) Ota, M.; Isobe, J.; Tsuji, Y.; Kuramoto, T.; Hoshita, T. (Hiroshima Univ. Sch. Medicine, Hiroshima, Japan). *Hiroshima J. Med. Sci.* 26(4):233-251; 1977.

The absorption, distribution, excretion, and metabolism of ^{14}C-labeled ursodeoxycholic acid (30 mg/kg p.o. or i.v. as a single dose or once daily for 21 days) in male and pregnant female Wistar rats were studied. The bile acid was absorbed rapidly (>70% within 2 hr) by passive diffusion (the time course was a straight line) and was distributed along with its metabolites only in the hepatobiliary system and gastrointestinal tract. The greater amount was in the latter site, suggesting that the main pool of ursodeoxycholic acid is in the small intestine. There was no accumulation of bile acid, which was excreted primarily in the feces with negligible amounts in the urine and respiratory CO_2. The half-life of ursodeoxycholic acid after a single p.o. dose was 2.3 days and after 21 p.o. doses was 1.5 days. There was a conspicuous transportation of the bile acid through the placenta with distribution in the fetal liver and intestine, but there was little secretion in the milk. The bile acid disappeared more rapidly from the fetus than from the maternal intestine. Ursodeoxycholic acid was converted to tauroursodeoxycholate in the liver, and the latter was partially converted to tauromuricholate. The conjugated bile acids, which represented >70% of the input radioactivity, were hydrolyzed to the corresponding free bile acids in the colon, and lithocholic acid and hyodeoxycholic acid were formed, resp., in the intestine as further metabolic products. The latter metabolites and muricholic acid were the major metabolites excreted in the feces. A metabolic scheme for ursodeoxycholic acid is presented; its metabolic fate closely resembles that of chenodeoxycholic acid except that fewer 6-hydroxylated metabolites are formed, suggesting that the liver enzymes responsible for metabolizing these two bile acids cannot metabolize them to the same extent.

7410 STUDIES ON LIPID METABOLISM IN RATS FED ON HIGH FAT AND HIGH CARBOHYDRATE DIETS WITH REFERENCE TO THE INDUCTION OF FATTY LIVER. PART I. BIOCHEMICAL OBSERVATIONS. (Eng.) Sato, F.; Mizunuma, T. (Sch. Medicine, Tokushima Univ., Tokushima, Japan). *Tokushima J. Exp. Med.* 24(3/4): 95-104; 1977.

To learn whether the factors that control hepatic triglyceride synthesis contribute to the etiology of lipemia induced by carbohydrate and of fatty liver induced by fat, changes in enzyme systems concerned with triglyceride synthesis were studied in male Wistar rats given high carbohydrate or high fat diets. Disc-electrophoresis of serum lipoproteins showed that the very low density lipoprotein fraction was much greater in rats fed the carbohydrate diet than in rats fed the fat diet, the triglyceride and cholesterol levels being significantly increased in the latter group at several sampling times ($p<0.05$). This finding indicated that the increased liver lipid content of rats on the high fat diet was due mainly to increased triglyceride. The serum triglyceride level was significantly higher in the animals on the high carbohydrate diet (97 ± 9 mg/dl) than in those on the high fat diet (34 ± 5 mg/dl, $p<0.05$), as were the activities of glucokinase (20.1 ± 1.4 versus 11.0 ± 0.9 µmol/min, $p<0.05$) and acetyl-coenzyme A carboxylase (2.3 ± 0.1 versus 1.8 ± 0.1 µmol/min, $p<0.05$). The serum level of ketone bodies and the activities of phosphoenolpyruvate carboxykinase, glycerol kinase, acyl-CoA synthetase, and diacylglycerol acyltransferase were significantly higher in the animals on the high fat diet than in those fed the high carbohydrate diet (1.49 ± 0.24 versus 0.84 ± 0.16 µmol/ml, 75.6 ± 4.6 versus 45.3 ± 3.4 µmol/min, 29.0 ± 1.7 versus 20.0 ± 2.1 µmol/min, 0.91 ± 0.04 versus 0.71 ± 0.05 µmol/min, and 1.76 ± 0.12 versus 1.24 ± 0.1 µmol/

min, resp., $p<0.05$ in all cases). The serum levels of cholesterol, phospholipid, free fatty acid, and glucose; the activities of α-glycerophosphate dehydrogenase and cholinephosphotransferase; and the incorporation of ^{14}C-leucine into liver protein were similar in the two groups. These results suggest that excess triglyceride formation over phospholipid formation might have an unfavorable effect on lipoprotein formation in rats on the high fat diet or that triglyceride might be combined with phospholipid and secreted easily as lipoprotein in rats on the high carbohydrate diet.

7411 STUDIES ON LIPID METABOLISM IN RATS FED ON HIGH FAT AND HIGH CARBOHYDRATE DIETS WITH REFERENCE TO THE INDUCTION OF FATTY LIVER. PART II. ELECTRON MICROSCOPIC HISTOCHEMISTRY. (Eng.) Sato, F.; Mizunuma, T. (Sch. Medicine, Tokushima Univ., Tokushima, Japan). *Tokushima J. Exp. Med.* 24(3/4):105-112; 1977.

To elucidate the structural changes that occur in liver cells as the fat content increases, the relationship between the formation of fat droplets and abnormalities in the organelles during the development of fatty liver was studied by light and electron microscopy in male Wistar rats fed a high fat or high carbohydrate diet. After 24 hr of the high fat diet, numerous osmiophilic particles appeared in the hepatic cells on the sinusoidal surface and in the Golgi apparatus adjacent to the space of Disse. After 72 hr, large (0.3-1.7 μm) lipid droplets without limiting membranes were sometimes found in the cytoplasm of liver cells, and they seemed gradually to increase in number and size. Characteristic changes were observable by light microscopy after 3 and 7 weeks of the high fat diet: large lipid droplets were located in the peripheral and intermediate areas of the hepatic lobules, while a few small droplets were seen in the central area. After 3 weeks, there was a marked increase in the number of lipid droplets in the liver cells, and the rough endoplasmic reticulum had lost its lamellar configuration and was dilated and empty. After 7 weeks, many large lipid droplets with glucose-6-phosphatase reaction products adhering to their surfaces were seen in the cytoplasm, but the lipid droplets and mitochondria had no detectable enzyme activity. The large lipid droplets may have been formed by the fusion of smaller droplets. After 7 weeks of the high carbohydrate diet, many glycogen granules were seen between the mitochondria and endoplasmic reticulum, but there were virtually no lipid droplets. The data suggested that the ultrastructural changes in fatty liver result from the reduction of lipoprotein formation in the endoplasmic reticulum, which is related to the removal of triglyceride from the liver.

7412 THE EFFECT OF THE GALLBLADDER ON THE CYCLING FREQUENCY OF THE BILE ACID POOL IN MAN [Abstract]. (Eng.) von Bergmann, K. (Dept. Internal Medicine, Univ. Bonn, Bonn, W. Germany). *Digestion* 16(4):322-323; 1977.

7413 ADENYLATE CYCLASE, THE BEST PLASMA MEMBRANE MARKER IN THE HUMAN LIVER [Abstract]. (Fre.) Pecker, F.; Duvaldestin, P.; Berthelot, P.; Hanoune, J. (Unite de Recherches, INSERM, U-99, Hopital Henri-Mondor, F 94010 Creteil, France). *Gastroenterol. Clin. Biol.* 1(8/9):717; 1977.

7414 SERUM LEVEL OF TOTAL BILE ACIDS AND CHOLIC ACID PLASMA CLEARANCE AS A LIVER FUNCTION TEST [Abstract]. (Fre.) Poupon, R. Y.; Poupon, R. E.; Petit, D.; Infante, R.; Darnis, F. (Hopital Saint-Antoine, F 75012 Paris, France). *Gastroenterol. Clin. Biol.* 1(8/9):719; 1977.

7415 PHYSIOPATHOLOGY OF BILE SECRETION. (Ita.) Gentilini, P. (III Cattedra di Patologia speciale medica e Metodologia clinica, Universita, Florence, Italy). *Recent. Prog. Med. (Roma)* 63(2): 113-136; 1977.

7416 HEPATOCYTE HETEROGENEITY AND BILE SECRETION IN THE RAT [Abstract]. (Fre.) Balabaud, C.; Gumucio, J. J.; Miller, D. L.; Appelman, H. D. (No affiliation given). *Gastroenterol. Clin. Biol.* 1(8/9):705; 1977.

7417 PHARMACOLOGY OF CHENODEOXYCHOLIC ACID [Abstract]. (Fre.) Roze, C. (Hopital Bichat, 170, boulevard Ney, F 75877 Paris Cedex 18, France). *Gastroenterol. Clin. Biol.* 1(11): 960; 1977.

7418 TOXICOLOGY OF CHENODEOXYCHOLIC ACID. (Fre.) Infante, R.; Bouma, M. E.; Lageron, A.; Levy, V. G. (Unite de Recherches d'Hepatologie [U-9] de l'INSERM, Hopital Saint-Antoine, 75012 Paris, France). *Therapie* 32(4):401-402; 1977.

7419 INFLUENCE OF VARIOUS DIETARY HYDROCARBONS ON THE EFFECT OF THE ADDITION OF CHOLESTEROL. (Ger.) Forster, H.; Heller, G.; Fortmeyer, H. P. (Zentrum der Biologischen Chemie und Tierversuchsanlage der Universitat, Theodor-Stern-Kai 7, 6000 Frankfurt/M., W. Germany). *Z. Ernaehrungswiss.* 16(2):128-139; 1977.

7420 ROLE OF KUPFFER'S CELLS IN HEPATIC IMMUNOSUPPRESSION [Abstract]. (Fre.) Vuitton, D.; Eloy, R.; Vaultier, J. P.; Grenier, J. F. (INSERM, U-61, avenue Moliere, F 67200 Strasbourg Hautepierre, France). *Gastroenterol. Clin. Biol.* 1(8/9):720-721; 1977.

7421 EFFECT OF SPLENECTOMY ON LIVER MACROPHAGES DURING REGENERATION FOLLOWING HEPATECTOMY IN THE RAT [Abstract]. (Fre.) Maes, J. M.; Brouwer, P. J.; Kesteloot, N. (Vrije Universiteit Brus-

sel Institut voor Morfologie, Brussels, Belgium). *Gastroenterol. Clin. Biol.* 1(8/9):715-716; 1977.

7422 MICROCIRCULATION OF THE NORMAL DOG HEPATIC BLOOD BED AND UNDER EXTENSIVE RESECTION OF THE LIVER. (Rus.) Khudajberdyev, R. I.; Bakhadyrov, F. N. (Dept. Normal Anatomy, Medical Inst., Tashkent, USSR). *Arkh. Anat. Gistol. Embriol.* 73 (8):71-74; 1977.

7423 LIGATION OF THE HEPATIC ARTERY IN THE RABBIT. (Fre.) Descottes, B.; Airault, C.; Cubertafond, P.; Moulies, D.; Couillaud, D. (No affiliation given). *Bordeaux Med.* 9(25): 2027-2028; 1976.

7424 EXTRACORPOREAL PERFUSION WITH BABOON LIVER IN THE TREATMENT OF HEPATIC COMA. (Ger.) Fischer, M.; Vogel, G. E.; Bottermann, P. (Chirurgische Klinik rechts der Isar, Technische Universitat, Ismaninger Str. 22, 8000 Munich 80, W. Germany). *Dtsch. Med. Wochenschr.* 102(50): 1862; 1977.

7425 INFLUENCE OF NORMOTHERMIC ISCHEMIA OF THE HUMAN LIVER ON HEPATOCELLULAR BIOLOGY [Abstract]. (Fre.) Huguet, C.; Nordlinger, B.; Conard, J. (Hopital Saint-Antoine, Paris, France). *Gastroenterol. Clin. Biol.* 1(8/9):712-713; 1977.

7426 CLINICAL INVESTIGATION INTO THE PROTECTIVE EFFECT OF 4-AMINO-5-IMIDAZOLE CARBOXAMIDE AND OROTIC ACID ON THE LIVER. (Ger.) Feher, J.; Jakab, L.; Tenczer, J.; Szilvasi, I. (III. Medizinischen Klinik der Semmelweis-Universitat, Mezo Imrie ut 17, H-1430 Budapest VIII, Hungary). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(4):175-179; 1977.

7427 INCREASE IN FATTY ACID STORAGE IN THE ISOLATED LIVER FOLLOWING PROTEIN Z SYNTHESIS INDUCTION BY CLOFIBRATE [Abstract]. (Fre.) Renaud, A.; Foliot, A.; Infante, R. (Unite de Recherches U-9, INSERM, 75571 Paris Cedex 12, France). *Gastroenterol. Clin. Biol.* 1(8/9):719-720; 1977.

7428 SIDE-EFFECTS OF α-METHYLDOPA ON THE LIVER. (Ger.) Zenos, A. (Klinik fur Innere Medizin, Wilhelm-Pieck-Universitat, Rostock, E. Germany). *Z. Gesamte Inn. Med.* 33(3):88; 1978.

7429 EFFECTS OF Fumaria EXTRACT, PROTOPINE AND PAPAVERINE ON THE BILE SECRETION OF THE RAT DURING HYPOCHOLERESIS. (Fre.) Reynier, M.; Lagrange, E.; Haring, J.; Vigouroux, M. (Centre de Recherches Laboratoire Roger-Bellon, 90, rue Marcel-Boudarias, 94140 Alfortville, France). *Trav. Soc. Pharm. Montpellier* 37(2):73-84; 1977.

7430 BLOOD COAGULATION DISTURBANCES OF RATS AFTER ACUTE LIVER DAMAGE PRODUCED BY D-GALACTOSAMINE-HCl. (Ger.) Kostering, H.; Riesenkampff, W. G.; Guerrero, M. A.; Kositzki, H. (Medizinische Universitatsklinik, D-3400 Gottingen, W. Germany). *Z. Gastroenterol.* 15(8):512-527; 1977.

7431 COMPARISON OF THE PHYSIOLOGICAL EFFECTS OF PARTIALLY HYDROGENATED HERRING OIL AND COLZA OIL IN THE RAT. PART II. IMMEDIATE AND MEDIUM-TERM EFFECTS ON THE LIPIDS OF THE HEART, LIVER AND ADIPOSE TISSUE. (Fre.) Astorg, P. O.; Cluzan, R. (Centre de Recherches de Dijon, I.N.R.A., B.V. 1540, 7, rue Sully, 21034 Dijon Cedex, France). *Ann. Nutr. Aliment.* 31(1):43-68; 1977.

7432 THE HYPOBILIRUBINEMIC ACTION OF NICOPHESONE. (Rus.) Pidemskii, E. L.; Mardanova, L. G.; Saperova, E. F. (Lab. Biologically Active Substances, Inst. Natural Sciences, Perm Univ., Perm, USSR). *Farmikol. Toksikol.* 40(5):588-591; 1977.

7433 INDUCTION OF PROLIFERATION OF MICROFILAMENTS AND CHOLESTASIS BY PHALLOIDIN IN THE RAT [Abstract]. (Fre.) Dubin, M.; Maurice, M.; Feldmann, G.; Erlinger, S. (Hopital Beaujon, F 92118 Clichy Cedex, France). *Gastroenterol. Clin. Biol.* 1(8/9):709-710; 1977.

7434 MECHANISM OF TILORONE-INDUCED CHOLESTASIS [Abstract]. (Fre.) Hoenig, V.; Werner, F. (Centre de Recherche Merrell International, 16, rue d'Ankara, F 67084 Strasbourg Cedex, France). *Gastroenterol. Clin. Biol.* 1(8/9):711-712; 1977.

7435 ULTRASTRUCTURAL STUDY OF ACUTE DEGENERATIVE TOXIC HEPATITIS INDUCED BY FELINE VIRUS 3 (FV3) [Abstract]. (Fre.) Bingen, A.; Kirn, A.; Jendrault, G. L. (Laboratoire de Virologie, 3, rue Koeberle, 67000 Strasbourg, France). *Biol. Cell.* 29(1):21a; 1977.

See also, 7277, 7279, 7280, 7320, 7451, 7466, 7829, 7851, 7858, 7878, 7896, 7904, 7940.

7436 ENTEROCYTE TURNOVER AND CONTENT IN FAT-FED HAMSTERS. (Eng.) Mansbach, C. M., II (Veterans Admin. Hosp., 508 Fulton St., Durham, NC 27705). *Am. J. Dig. Dis.* 23(6):486-492; 1978.

To determine if a physiological basis exists for the increase in specific activities of cryptal lecithin-synthesizing enzymes seen in hamsters fed a fat-supplemented diet, ^{3}H-thymidine incorporation, cellular migration rate, and mucosal concentration of DNA, protein, and lecithin were measured. Radioautographic studies showed that the labeling index and cell migration rate throughout the intestine in the fat-fed hamsters and in the proximal three-quarters of the intestine of the control group were the same. Both parameters were reduced in the distal quarter of the control intestine in comparison with the values in the hamsters fed the fat-supplemented diet ($p<0.02$ and $p<0.01$, resp.). The protein/DNA ratio was significantly increased in the proximal three-quarters (a 50% reduction in DNA content) and modestly in the distal quarter of the intestine of the fat-fed group as compared to controls, suggesting cellular hypertrophy. The lecithin content of the proximal three-quarters of intestine was the same in both groups but reduced in the distal quarter of the gut of the fat-fed group ($p<0.0320$). These studies suggest that lipid feeding in the hamster can have profound effects on intestinal cellular content and turnover.

7437 PANCREATIC, GALLBLADDER, AND INTESTINAL RESPONSES TO INTRALUMINAL MAGNESIUM SALTS IN MAN. (Eng.) Malagelada, J. R.; Holtermuller, K. H.; McCall, J. T.; Go, V. L. W. (Mayo Clinic, 200 First St. SW, Rochester, MN 55901). *Am. J. Dig. Dis.* 23(6):481-485; 1978.

To investigate further the mechanisms of action of magnesium salts as laxatives and choleretics, an *in vivo* bioassay was used to quantify the effects of duodenal $MgSO_4$ or $MgCl_2$ on the release of cholecystokinin (CCK) and to compare them with the effects of Ca or fatty acids previously studied under similar conditions. The intraduodenal perfusion of a nonabsorbable marker was used to measure pancreatic enzyme outputs in response to intraluminal stimuli, and total bilirubin outputs and net jejunal fluid movements were simultaneously quantified in 10 healthy volunteers. Perfusions of both $MgSO_4$ and $MgCl_2$ at concentrations >6 mM (12, 25, or 50 mM) significantly ($p<0.05$) increased trypsin output above the saline control, and the 50 mM $MgSO_4$ and $MgCl_2$ perfusions significantly ($p<0.05$) increased bilirubin output above the control. In neither case was there any difference in effect between equimolar concentrations of the two Mg salts. The 50 mM $MgCl_2$ perfusion inhibited jejunal water absorption significantly compared with the saline control ($p<0.01$); the 50 mM $MgSO_4$ perfusion was more potent and induced a net water secretion when compared with either the control ($p<0.01$) or the 50 mM $MgCl_2$ perfusion ($p<0.05$). These results demonstrate that magnesium salts exert a moderate stimulatory effect on pancreatic enzyme secretion and gallbladder contraction and that these actions are due to the Mg ion. However, much greater concentrations of Mg than of Ca or oleic acid (results of previous work) were required to exert this effect. Because the overall release of CCK depends on the length of bowel containing CCK-releasing cells that is exposed to a given stimulus, Mg is probably a weak stimulus to these cells or, alternatively, it triggers unidentified neurohormonal mechanisms that reduce its net CCK-like action. The actions of Mg salts on the digestive system are probably due to multiple mechanisms.

7438 ELECTRON IMMUNOHISTOCHEMICAL EVIDENCE FOR THE HUMAN INTESTINAL I CELL AS THE SOURCE OF CCK. (Eng.) Buchan, A. M. J.; Polak, J. M.; Solcia, E.; Capella, C.; Hudson, D.; Pearse, A. G. E. (Hammersmith Hosp., London W12 OHS, England). *Gut* 19(5):403-407; 1978.

Alternate semithin-thin serial sections for light and electron microscopy and antibodies to a synthetic fragment of the midpart of the cholecystokinin-pancreozymin (CCK-PZ) molecule (i.e., 9-20) that was free of cross-reacting subpopulations to gastrin were used to identify the cell source of CCK-PZ. Twenty-five surgical samples of human antrum, duodenum, and jejunum were examined. Scattered endocrine cells within the duodenal and jejunal mucosa were specifically stained by CCK-PZ (9-20), whereas the antrum failed to show any positive staining in the semithin sections. The CCK-PZ cells were then identified at the ultrastructural level on consecutive sections as a homogeneous population of cells with mainly round, sometimes angular, relatively dense granules averaging 260 ± 22 nm in size; the corrected value was 330 nm. I cells as identified by conventional electron microscopy also showed mainly round, compact granules with closely applied membrane, measuring 253 ± 58 nm in size; the corrected value was 322 nm. None of the cells reacting with the CCK-PZ (9-20) antibodies were G cells by conventional electron microscopy. The I cell is the source of CCK-PZ in humans.

7439 MOTILIN RELEASE IN THE PIG. (Eng.) Modlin, I. M.; Mitznegg, P.; Bloom, S. R. (Dept. Surgery, UCLA, Los Angeles, CA). *Gut* 19(5): 399-402; 1978.

Motilin release in the pig was investigated *in vivo* to clarify some of the species differences that seem to exist between the pig, the dog, and man. When 30 cm of distal duodenum and proximal small intestine were perfused with normal sodium chloride for 15 min, motilin levels in the portal vein and peripheral blood remained steady at 62 ± 10.6 pM and

54 ± 9.7 pM, resp. Following acid perfusion (0.1 M HCl at 1 ml/min), the plasma motilin concentration increased to a peak at 15 min of 111.2 ± 9.4 pM in the portal blood and 98 ± 8.6 pM in the peripheral blood, and these levels were maintained until the vascular pedicle of the perfused small bowel was clamped at 30 min. Despite continued perfusion with acid, the mean portal motilin level fell to 41 ± 4.8 pM and the mean peripheral blood motilin level to 38 ± 5.0 pM during clamping. When the vascular clamp was released after 20 min, the motilin level rose to a peak by 10 min (191 ± 23 pM in the portal blood and 180 ± 20 pM in the peripheral blood). Calculation of the disappearance half-time after clamping gave a value of 3.9 ± 0.2 min, with a good straight-line fit (r= 0.992). Ingestion of a 300-g meal did not significantly alter the fasting basal systemic plasma level of motilin (45 ± 6 pM) during a 75-min sampling period. Motilin release appears to be an entirely local phenomenon, and its physiological role remains speculative. It may play a role in mediating the motor response to lowered duodenal pH.

7440 EFFECTS OF HYPOPHYSECTOMY AND HYPOPHYSECTOMY PLUS GROWTH HORMONE ON SECRETIN RELEASE AND ON CONCENTRATIONS OF SECRETIN IN THE DUODENAL MUCOSA. (Eng.) Teichmann, R. K.; Schafmayer, A.; Hill, F. L. C.; Rayford, P. L.; Thompson, J. C. (Univ. Texas Medical Branch, Galveston, TX). *Surg. Forum* 28:375-376; 1977.

A study was carried out to test the effects of hypophysectomy (hypo-x) and hypo-x plus growth hormone (GH) on secretin levels in the blood and in the duodenum of the rat before and after duodenal perfusion with HCl. The 60 hypophysectomized Sprague-Dawley rats received either saline s.c. (30 controls) for 10 days or 25 μg GH s.c. for 10 days and were then tested along with 60 unoperated controls by infusion of HCl (0.1 N, 0.7 ml/min via a catheter) with sampling of blood and tissue prior to and at 5, 15, 30, and 60 min after infusion. The mean basal plasma secretin level was markedly lower in hypo-x rats (113 pg/ml) than in intact (134 pg/ml) or hypo-x plus GH rats (166 pg/ml). However, at 5 min, the hypo-x rats had markedly higher mean plasma secretin levels than did the intact or hypo-x plus GH rats (374, 251, and 285 pg/ml, resp.). All three groups showed a decrease in mean plasma secretin level after 60 min of irrigation with HCl (155, 176, and 181 pg/ml, resp.). Hypo-x rats had the highest mean basal secretin level in duodenal mucosal tissue (442 ng/g), whereas the intact and hypo-x plus GH rats had lower values that were similar to each other (229 and 242 ng/g, resp.). Continuous acid perfusion produced a stepwise depletion of mucosal secretin levels up to 30 min (100, 79, and 109 ng/g in hypo-x, intact, and hypo-x plus GH rats, resp.) with no further significant change by 60 min. The increased duodenal secretin stores may be responsible for the initial large secretin release in response to HCl seen in hypo-x rats. Because GH reverses these effects, the pituitary may play a role in the release and metabolism of secretin.

7441 IMMUNOHISTOCHEMICAL LOCALISATION OF UROGASTRONE TO HUMAN DUODENAL AND SUBMANDIBULAR GLANDS. (Eng.) Heitz, P. U.; Kasper, M.; Van Noorden, S.; Polak, J. M.; Gregory, H.; Pearse, A. G. E. (Dept. Pathology, Univ. Basel, Schonbeinstrasse 40, CH-4056 Basel, Switzerland). *Gut* 19(5):408-413; 1978.

To establish the precise localization of urogastrone in normal human tissues, immunostaining and improved cytochemical techniques were used on freeze-dried human tissue samples fixed in formaldehyde vapor. Fresh operative samples of tissue surrounding tumors of submandibular and parotid glands and kidney and operative and biopsy specimens from pancreas, corpus and antrum of stomach, duodenum, jejunum, ileum, and colon were examined. All tissues were normal by histological examination. The immunoreactive peptide gave positive granular immunostaining in the submandibular gland acini and the duodenal (Brunner's) gland acini and ducts. Cells of the duodenal glands had immunostaining localized to the supranuclear part of cytoplasm. Increased immunostaining was observed in the duct cells of duodenal glands with little or no staining of the duodenal crypt epithelium. The content of the ducts and part of the duodenal surface film also showed intense reaction. In the submandibular glands, the immunostain was confined to granules of some acinar cells. The duct cells did not show any reaction. Immunostaining observed in the pyloric glands was considered to be nonspecific. No immunostaining was seen in the other tissues tested. It is conceivable that urogastrone is a protective factor with a dual action: inhibition of gastric acid secretion and stimulation of cell proliferation or regeneration of the intestinal mucosa. Thus it may have both regulatory and protective functions and may be useful as a therapeutic agent.

7442 INTESTINAL MUCOSAL HYDROLYSIS OF PROTEINS AND PEPTIDES. (Eng.) Kim, Y. S. (Veterans Admin. Hosp., San Francisco, CA). *Ciba Found. Symp.* 50(New Series):151-176; 1977.

7443 INTESTINAL BRUSH BORDER PEPTIDASES. (Eng.) Noren, O.; Sjostrom, H.; Svensson, B.; Jeppesen, L.; Staun, M.; Josefsson, L. (Dept. Biochemistry C, Univ. Copenhagen, Copenhagen, Denmark). *Ciba Found. Symp.* 50(New Series):177-197: 1977.

7444 INTRACELLULAR HYDROLYSIS OF PEPTIDES. (Eng.) Josefsson, L.; Sjostrom, H.; Noren, O. (Dept. Biochemistry C, Univ. Copenhagen, Copenhagen, Denmark). *Ciba Found. Symp.* 50(New Series):199-207; 1977.

7445 INTESTINAL HYDROLYSIS OF DISACCHARIDES AND PEPTIDES: COMPARISON OF HYDROLASES AND PERFUSION STUDIES. (Eng.) Rhodes, J. B.; Arvanitakis, C.; Folscroft, J. (Univ. Kansas Medical

Center, Kansas City, KS). *Ciba Found. Symp.* 50(New Series):245-263: 1977.

7446 INTESTINAL DIPEPTIDASES AND DIPEPTIDE TRANSPORT IN THE MONKEY AND IN MAN. (Eng.) Radhakrishnan, A. N. (Sch. Life Sciences, Univ. Hyderabad, Hyderabad-500001, India). *Ciba Found. Symp.* 50(New Series):37-59; 1977.

7447 A BRUSH-BORDER-BOUND PEPTIDASE AND AMINO ACID TRANSPORT. (Eng.) Wacker, H.; Semenza, G. (Laboratorium fur Biochemie der Eidgenossischen Technischen Hochschule, Zurich, Switzerland). *Ciba Found. Symp.* 50(New Series): 109-121; 1977.

7448 AN EXPERIMENTAL STUDY ON THE ARTIFICIAL INTESTINAL VALVE BY TELESCOPING ANASTOMOSIS. (Eng.) Zheng, H. L. (Kitano Hosp., 3-Hishiogimachi, Kita-ku, Osaka 530, Japan). *Arch. Jpn. Chir.* 46(6):657-679; 1977.

See also, 7272, 7276, 7285, 7296, 7311, 7312, 7313, 7320, 7321, 7449, 7452, 7454, 7459, 7463, 7467, 7477, 7656, 7657, 7721, 7940.

GENERAL

7449 APOPTOSIS IN THE SMALL INTESTINE OF ZINC-DEFICIENT AND FASTED RATS. (Eng.) Elmes, M. E. (Univ. Hosp. Wales, Heath Park, Cardiff CF4 4XN, Wales). *J. Pathol.* 123(4):219-224; 1977.

A study was carried out to determine whether apoptotic bodies (membrane-bounded bodies formed by the condensation and fragmentation of the cell during cell death) occur in the small intestine of rats during zinc deficiency. Forty-two Wistar-derived albino rats were divided into zinc-deficient (diet with <1 ppm zinc), pair-fed control (4 ppm Zn^{2+} supplement in diet), and *ad libitum*-fed control (11 ppm Zn^{2+} in diet) groups for 4-6 weeks; 40 female Wistar rats were divided into 5 groups: unfasted and 24, 48, 72, or 96-hr fasted rats. Electron microscopy revealed a few apoptotic bodies derived from scattered single cells in the control small intestines (averages of 1.6, 3.25, and 3.1 apoptotic bodies/5-μm section in the duodenum, jejunum, and ileum, resp.). The zinc-deficient animals showed severe signs of zinc deprivation; pair-fed controls were underweight but fit and *ad libitum*-fed controls were healthy. While all animals had apoptotic bodies, these were too numerous to count in the zinc-deficient rats. The number of these bodies was greatest in the duodenum and jejunum and least in the ileum, with wide variations among animals; the bodies were present mainly in the midzone of the crypts. The number of apoptotic bodies in the jejunum and ileum of fasted rats increased with the length of the fast and were numerous in both the midzone and fundus of crypts after 72 hr of fasting. The results demonstrate that apoptotic bodies occur normally in small numbers in the rat intestine and are markedly increased in number during zinc starvation and fasting. It is suggested that the failure of DNA synthesis that may occur during both zinc starvation and fasting may increase the rate of cell death by apoptosis.

7450 REARING REGIMEN PRODUCING PIGLET DIARRHEA (ROTAVIRUS) AND ITS RELEVANCE TO ACUTE INFANTILE DIARRHEA. (Eng.) Lecce, J. G.; King, M. W.; Dorsey, W. E. (Dept. Animal Science, North Carolina State Univ., Raleigh, NC 27607). *Science* 199 (4330):776-778; 1978.

To develop a successful regimen for weaning and rearing excess piglets (those a sow cannot adequately nurse in a large litter) adaptable to existing farm conditions, several experiments were carried out. When 93 piglets farrowed on a commercial farm were taken after 1 day of nursing and reared over 1.5 months in an isolated nursery with an automatic feeding device (Autosow) to 2 weeks of age, 70% experienced vomiting and diarrhea after 1 week; 43/93 were treated with 25 ml cow colostrum (3 times/day for 5 days) and 7% died; 50/93 were not treated and 29% died. Weight gains in the survivors were only 2.5 instead of 3-4 times their birth weights. When piglets farrowed in a sanitary environment and nursed for 1 day were placed in a fresh nursery with new groups introduced every 10 days (producing continuous, overlapping use of the nursery), about seven litters were reared without incident to the expected 2-week weight gain over a 5-week period. Then a mild, transient diarrhea lasting <1 day occurred in the older pigs. Between 5 and 7 weeks of nursery use, the diarrhea became more pronounced, of longer duration, and affected more piglets; sometimes initial vomiting occurred, but there was no dehydration and no death. Between 7 and 9 weeks, all entering piglets began vomiting at 3-5 days of age, they underwent dehydration, the death rate was ≥50%, and the surviving piglets gained only 2.5 times their birth weights. After 9 weeks, all piglets began vomiting 2-4 days after entry and were dead by 10 days of age. Bacteria-free infectious material containing large numbers of rotavirus (about 10^9/ml) was obtained from diarrheal fluid.

The experiment was repeated for six successive cycles of the same description (the cycles were sometimes shorter but always showed the pattern of increasing severity) with a complete cleaning, fumigation, and 1-week period of vacancy between cycles. There was no correlation between the number of airborne bacteria (always 500-1,000/m^3) and either the length of continuous use of the nursery or the initiation of diarrhea. Antibodies to pig rotavirus were found in all samples of pooled cows' colostrum tested. Eighty-eight percent of 150 sows in 14 herds had antibodies to pig rotavirus that could be passed to their 1-day-old piglets via colostrum. It is concluded that, in the natural situation, the high prevalence of rotavirus assures that the neonate will first encounter it while passively protected by colostral antibodies and that an active immunity will issue from constant exposure without the burden of overt disease. However, the nursery contains susceptible piglets (those >1 day old and without colostral antibody) capable of amplifying the infection; with continuous use, an infection of increasing severity passes from young to young. Cleaning the delivery room to lower the initial viral dose, cleaning the nursery between groups to prevent amplification, and using p.o. antibody therapy can prevent the disease.

7451 A SIMPLE ENZYMATIC METHOD FOR ISOLATION OF HEPATOCYTES. (Eng.) Igarashi, S. (Tokyo Hosp., Japan Monopoly Corporation, 1-4-3 Mita, Minato-ku, Tokyo, Japan). *Experientia* 33 (10):1401-1402; 1977.

A new technique for the isolation of hepatocytes was developed. Liver was removed aseptically as a whole from Wistar rats, washed with physiological saline, injected (10 ml/min) with 20 ml of 0.05% bacterial collaginase in Ca-free Hank's solution (that was warmed in advance to 37 C) at one or more sites to produce a diffuse whitish color change of the whole liver, washed once in Ca-free Hank's solution, and then torn into small pieces with forceps in a dish containing 10-20 ml of the solution. Hepatocytes were liberated during this procedure. The tissue- and cell-containing solution was filtered through a 150-mesh platinum sieve and centrifuged at 200 rpm for 3 min. The sediment was suspended in 10 ml of Eagle's minimum essential medium (MEM) and centrifuged again for two cycles of purification to remove RBC. The recovery of hepatocytes was >90% of the amount of the initially isolated cells (average of 10 experiments was $7.86 \pm 4.24 \times 10^6$ cells/g wet tissue). The contamination by mesenchymal cells was <1%. More than 95% of the isolated hepatocytes excluded trypan blue. The rate of glucose production from 2 µmol of alanine or lactate was 7.76 and 8.67 nmol/hr/10^6 cells for alanine and 16.33 and 10.87 nmol/hr/10^6 cells for lactate in two separate experiments. The new technique is simple, reduces the preparation time to 1/2-1/3 compared with hepatic perfusion methods, and lowers the risk of bacterial or fungal contamination during isolation.

7452 EXTREME SENSITIVITY OF SOME INTESTINAL CRYPT CELLS TO X AND γ IRRADIATION. (Eng.) Potten, C. S. (Christie Hosp., Manchester, England). *Nature* 269(5628):518-521; 1977.

7453 VASCULAR CHRONIC-FIBROSING PANCREATITIS OF THE RAT AFTER 5/6-NEPHRECTOMY. (Eng.) Putzke, H. P.; Jonas, L.; Bienengraber, A. (Inst. General and Systemic Pathology, Wilhelm Pieck Univ. Rostock, Strempelstrasse 14, DDR-25 Rostock, E. Germany). *Exp. Pathol. (Jena)* 14(314):113-121; 1977.

7454 BLOOD FLOW AND OXYGEN CONSUMPTION IN THE FELINE SMALL INTESTINE: RESPONSES TO ARTIFICIAL DISTENSION AND INTESTINAL OBSTRUCTION. (Eng.) Ohman, U. (Karolinska Sjukhuset, Stockholm, Sweden). *Acta Chir. Scand.* 142(4):329-333; 1976.

7455 INTESTINAL PARASITOSIS OF RHESUS MONKEYS (Macaca mulatta) IN HEALTH AND DISEASE. (Eng.) Jindal, B. R.; Vinayak, V. K.; Chhuttani, P. N. (Postgraduate Inst. Medical Education and Res., Chandigarh, India). *Bull. Postgrad. Inst. Med. Educ. Res. Chandigarh* 11(3):110-113; 1977.

7456 PRODUCTION AND EVALUATION OF SECRETIN ANTIBODIES. (Eng.) Burhol, P. G.; Waldum, H. L. (9012 Univ. Hosp., Tromsoe, Norway). *Acta Hepatogastroenterol. (Stuttg.)* 25(2):139-143; 1978.

7457 DYNAMICS OF THE INTERACTION BETWEEN *Entamoeba histolytica* AND COMPONENTS OF THE IMMUNE RESPONSE. I. CAPPING AND ENDOCYTOSIS; INFLUENCE OF INHIBITING AND ACCELERATING FACTORS; VARIATION OF THE EXPRESSION OF SURFACE ANTIGENS. (Eng.) Aust-Kettis, A.; Sundqvist, K. G. (Natl. Bacteriological Lab., S-105 21 Stockholm, Sweden). *Scand. J. Immunol.* 7(1):35-44; 1978.

7458 THE INHIBITORY EFFECT OF HEPARIN ON TRYPSINOGEN ACTIVATION WITH ENTEROKINASE. (Eng.) Wolosowicz, N.; Prokopowicz, J.; Gabryelewicz, A. (Medical Sch., 15-276 Bialystok, Poland). *Acta Hepatogastroenterol. (Stuttg.)* 24(5):368-371; 1977.

7459 DIETARY, BACTERIAL, AND HOST GENETIC INTERACTIONS IN THE PATHOGENESIS OF TRANSMISSIBLE MURINE COLONIC HYPERPLASIA. (Eng.) Barthold, S. W.; Osbaldiston, G. W.; Jonas, A. M. (Yale Univ. Sch. Medicine, New Haven, CT 06510). *Lab. Anim. Sci.* 27(6):938-945; 1977.

7460 SCHISTOSOMIASIS MANSONI IN THE HAMSTER: CELLULAR AND HUMORAL IMMUNE RESPONSES TO SOLUBLE EGG ANTIGENS (SEA). (Eng.) Oberlin, U. P.; Weiss, N. (Swiss Tropical Inst., Basel, Switzerland). *Am. J. Trop. Med. Hyg.* 26(6, Part 1):1178-1182; 1977.

7461 IMMUNITY TO THE METACESTODE OF Taenia taeniaeformis IN THE LABORATORY RAT. (Eng.) Lied, R. W. (Veterinary Clinical Center, Michigan State Univ., East Lansing, MI 48824). *Am. J. Trop. Med. Hyg.* 26(6, Part 2):54-60; 1977.

7462 REJECTION OF WORM LOAD THROUGH SINGLY AND REPEATEDLY SENSITIZED PERITONEAL EXUDATE CELLS DURING EXPERIMENTAL ANCYLOSTOMIASIS. (Eng.) Vardhani, V.; Johri, G. N. (Sch. Studies in Zoology, Vikram Univ., Ujjain 456-010, India). *Experientia* 34(1):122-123; 1978.

7463 INNERVATION OF THE DUODENAL SUBMUCOSAL BRUNNER'S GLANDS. (Eng.) Kyosola, K. (Dept. Anatomy, Univ. Helsinki, Helsinki, Finland). *Acta Physiol. Scand.* 101(4):498-500; 1977.

7464 CELLULAR CHANGES IN THE INTESTINAL LYMPH OF SHEEP INFECTED WITH THE ENTERIC NEMATODE, Trichostrongylus colubriformis. (Eng.) Adams, D. B.; Cripps, A. W. (C.S.I.R.O. Div. Animal Health, Sydney, New South Wales, Australia). *Aust. J. Exp. Biol. Med. Sci.* 55(Part 5):509-522; 1977.

7465 ORAL IMMUNIZATION OF MONKEYS WITH POLYVALENT DYSENTERY VACCINE. (Eng.) Dhikidze, E. K.; Kavtaradze, K. N.; Krilova, R. I.; Rauss, K.; Ketyi, I.; Vertenyi, A. (Inst. Experimental Pathology and Therapy, USSR Acad. Medical Sciences, P.O.B. 66, Gora Trapetziya, Sukhumi, USSR). *Acta Microbiol. Acad. Sci. Hung.* 24(1): 7-12; 1977.

7466 AN EXPERIMENTAL STUDY ON ENDOSCOPIC PAPILLOTOMY IN MONKEYS. (Eng.) Tanaka, M.; Ikeda, S.; Tamura, R.; Torisu, M.; Tasaka, K.; Yamamoto, T. (Kyushu Univ., Faculty Medicine, 3-1-1 Maidashi, Fukuoka 812, Japan). *Endoscopy* 9(3):140-146; 1977.

7467 DETECTION OF INTESTINAL ISCHEMIA: PART 2. TEMPERATURE DIFFERENCE BETWEEN MESENTERIC AND ANTIMESENTERIC MARGIN OF BOWEL AS A CRITERION OF INTESTINAL ANASTOMOSIS VIABILITY. (Eng.) Wapnick, S.; Solowiejczyk, M.; Grosman, E. (Veterans Admin. Hosp., Brooklyn, NY 11209). *Rev. Surg.* 34 (6):371-375; 1977.

7468 GASTROINTESTINAL BLOOD LOSS IN MAN DURING ADMINISTRATION OF TWO AMPICILLIN ESTERS. (Eng.) Magnusson, B.; Solvell, L.; Wessman, J. (Salgren's Hosp., S-413 45 Goteborg, Sweden). *Scand. J. Infect. Dis.* 9(3):218-220; 1977.

7469 COLITIS CYSTICA SUPERFICIALIS: A REPORT OF A CASE IN A BARBARY APE (Macaca sylvana). (Eng.) Scott, G. B. D. (Royal Free Hosp. Sch. Medicine, London NW3, England). *J. Pathol.* 124(1):23-25; 1978.

7470 HEALING OF THE OESOPHAGUS AFTER TOTAL LIGATION WITH THE BOEREMA BUTTON AND A SIMILAR APPARATUS ACTING WITH MAGNETIC FORCE: AN EXPERIMENTAL STUDY. (Eng.) Koomen, A. R.; Klopper, P. J. (St. Elisabeth of Groote Gasthuis, Haarlem, Netherlands). *Arch. Chir. Neerl.* 29(4): 217-228; 1977.

7471 TRANSPLANTATION OF THE SMALL INTESTINE: AN EXPERIMENTAL STUDY IN YOUNG MINIPIGS. (Eng.) Stauffer, U. G.; Becker, M.; Mona, D.; Kara, O. (Universitats-Kinderklinik Zurich, Steinweisstrasse 75, CH-8032 Zurich, Switzerland). *Res. Exp. Med.* 172(2):161-171; 1978.

7472 BLOOD FLOW IN INTESTINAL ABSORPTION MODELS. (Eng.) Winne, D. (Pharmakologisches Institut der Universitat Tubingen, D-7400 Tubingen, W. Germany). *J. Pharmacokinet. Biopharm.* 6(1):55-78; 1978.

See also, 7271, 7325, 7430, 7922, 7936.

DIAGNOSTIC PROCEDURES

7473 TRANSMUCOSAL POTENTIAL DIFFERENCE; DIAGNOSTIC VALUE IN GASTRO-OESOPHAGEAL REFLUX. (Eng.) Khamis, B.; Kennedy, C.; Finucane, J.; Doyle, J. S. (Royal Coll. Surgeons in Ireland, St. Laurence's Hosp., Dublin 7, Ireland). *Gut* 19(5): 396-398; 1978.

Transmucosal potential difference (PD) was determined in 19 patients with symptoms of upper gastrointestinal disease, and the values were correlated with the histological appearance of mucosal biopsy specimens taken from the area of contact with the exploring electrode. PD in the lower esophagus was recorded at endoscopy, and suction biopsy specimens were obtained from the site of measurement and examined by light microscopy after hematoxylin and eosin staining. In 10 patients with normal histology, mean PD was -14.4 ± 0.4 mV, whereas in the 9 patients with histological changes of reflux, the mean was +9.4 ± 3.0 mV. In this latter group, polarity of the PD was reversed in all but one case. Good correlation ($p<0.001$) was found between these objective indices of lower esophageal disease and the presence of symptoms such as dysphagia and heartburn. The visual appearance at endoscopy was less reliable. It is suggested that measurement of PD is a simple, rapid, and sensitive method of detecting the presence of esophageal mucosal damage.

7474 ENDOSCOPIC TOLUIDINE BLUE SCATTERING METHOD IN THE DIAGNOSIS OF GASTRIC LESIONS. (Eng.) Beker, S.; Eslava, F.; Zerpa, H.; Castillo, R.; Carballo, F.; Roa, E.; *et al.* (Apartado Postal 50794, Caracas, Venezuela). *Gastrointest. Endosc.* 24(2):72-73; 1977.

The efficacy of the direct application of toluidine blue to the gastric mucosa under immediate endoscopic observation in the diagnosis of gastric lesions was studied in 18 patients with normal stomach mucosae and 100 patients with gastric disease. The intensity of toluidine blue staining was graded from 0 (nonstained) to 4+ (deep royal blue staining). In 45 cases of gastritis without intestinal metaplasia, staining in the damaged mucosa was rated 1+ to 2+. In 16 cases of gastritis with intestinal metaplasia, toluidine blue stained between 2+ and 3+. In 17 gastric ulcers, staining was dark (3+ to 4+) at the base of the craters, but this was of no diagnostic value due to the presence of fibrin and to the healing process. The staining method was of value only when the dye appeared at the margins, where staining varied from 1+ to 2+; biopsy showed superficial gastritis and intestinal metaplasia. In 10 cases of scar formed after ulcer healing, 9 stained between 1+ and 2+, corresponding to the degree of gastritis. Of 12 patients with protuberant lesions, 6 were classified endoscopically as having benign polyps. In two polyps, with depressed centers, staining was 2+. In the other six protuberant lesions, endoscopically suspected as malignant, toluidine blue stained 4+, and the histologic diagnosis in all cases was adenocarcinoma. These results indicate that the endoscopic toluidine blue scattering method enhances the delineation of intestinal metaplasia and aids in the differential diagnosis of benign and malignant gastric ulceration.

7475 THE INFUSION SMALL-BOWEL STUDY. (Eng.) Loewig, K. R.; Sanders, D. E.; Ho, C. S. (Toronto General Hosp., Toronto, Canada). *Appl. Radiol.* 6(6):100-101, 104, 151-152; 1977.

The value of intubation with rapid (80-100 ml/min) barium infusion into the fourth part of the duodenum was evaluated in roentgenology of 600 patients; five case reports are given briefly. Direct infusion has four major advantages over the conventional method that contribute to improved definition of morphology: (1) full distention to elucidate contour defects and distensibility, (2) double-contrast demonstration for intraluminal defects, (3) hypotonia for improved definition, and (4) fluoroscopy of the entire small bowel. The technique's use in diagnosing Crohn's disease, stenosis and ulceration that proved to be an area of ischemic enteritis, possible tuberculosis, and possible *Yersinia enterocolitica* infection is illustrated. The technique improves the threshold for recognition of subtle lesions and provides better detail for identification of specific disease processes.

7476 RADIONUCLIDE DIAGNOSIS OF BLEEDING MECKEL'S DIVERTICULUM IN CHILDREN. (Eng.) Schussheim, A.; Moskowitz, G. W.; Levy, L. M. (Long Island Jewish-Hillside Medical Center, New Hyde Park, NY 11040). *Am. J. Gastroenterol.* 68(1):25-29; 1977.

The technique and results of ^{99m}Tc-pertechnetate scanning and computer analysis in 70 children with a suspected diagnosis of Meckel's diverticulum are presented. The patient is placed under the detector head of the scintillation camera so that some part of the stomach and the bladder is seen in the field of view. The videotape unit of the camera is started just prior to the injection of the sodium pertechnetate (0.15 mCi/kg, i.v.). The subsequent radioisotope distribution is visually monitored on the variable persistence oscilloscope and quantitatively recorded in digital mode for 60-90 min. Successive 4-min exposures are made at the exposure intensity that shows the general background activity as a slight haze, assuring that activities greater than background are visible. At 45 min after the injection, the patient voids so that ectopic foci might not be obscured by the accumulating radioactivity of the bladder contents. Meckel's diverticulum usually visualizes early and generally simultaneously with gastric mucosa. A positive Meckel's diverticulum examination is the observation of a discrete localized collection of radioactive material separate from the stomach and bladder appearing generally in the right lower quadrant. When the results are equivocal, data manipulation on the Prime 300 general purpose minicomputer helps to differentiate Meckel's diverticulum from nonspecific collections of radio-

activity. Five scans were positive in this series, and all were verified at surgery. None of the patients with negative scans have been subsequently found to have a diverticulum. The authors believe that this method is a safe procedure that should be considered a primary diagnostic modality in the investigation of children with suspected bleeding Meckel's diverticulum.

7477 EVALUATION OF ISCHEMIC BOWEL VIABILITY WITH A FLUORESCENT TECHNIQUE. (Eng.) Stolar, C. J. H.; Randolph, J. G. (Abraham Lincoln Sch. Medicine, 840 South Wood St., Chicago, IL 60612). *J. Pediatr. Surg.* 13(3):221-225; 1978.

A study was carried out to develop objective criteria for evaluation of small bowel viability following ischemia. The fluorescent pattern of ischemic rabbit intestine after the i.v. injection of sodium fluorescein was correlated with a clinical estimation of intestinal viability in 45 female New Zealand rabbits in which a 10-cm segment of distal ileum 15 cm proximal to the ileocecal valve was subjected to ischemia for periods of 4-12 hr. After 15 min of warming the ischemic segment, a clinical estimation of viability was made, 1 cm^3 of 5% sodium fluorescein was injected, and the segment photographed; a second-look operation was carried out 24 hr later. All animals were supported with gentamycin (3 mg/kg/day) and clindamycin (15 mg/kg/day) begun preoperatively and continued for 10 days, albumin (20 g/day, i.v.) until death or recovery, dexamethasone (1 mg/kg, one dose), sodium bicarbonate, and Ringer's solution. All ischemic segments were studied grossly and histologically at autopsy following death or sacrifice (at 6 weeks). Ten ischemic segments (4-7 hr of ischemia) exhibited a normal pattern of fluorescence (bright green, smooth, and evenly distributed in capillary beds) and of histology (exuberant mucosal villi and relatively thin serosa); all were predicted to survive by clinical criteria, and all did. Three patterns of abnormal fluorescence were seen. Type I was characterized by a diffuse reticular distribution of fluorescence, indicating a diminished blood supply in the small vessels, and by interstitial edema and mucosal loss, all of which reversed nearly completely over the 6 weeks. Twelve segments (ischemic for 5-10 hr) showed this pattern; 7/12 were predicted to survive but 12/12 actually survived. Type II was characterized by uneven dye distribution with large patchy areas of nonfluorescence, and the dye had disappeared completely 24 hr after injection. Twenty-three segments (ischemic for 7-12 hr) showed this pattern and fell into two groups. Group A (15/23) showed interstitial edema, mucosal loss, hemorrhage, granulation tissue, and scarring; 1/15 was predicted to survive; 10/15 actually survived. Group B retained the initial dye, which was seen after 24 hr in large confluent patches; a repeat dye injection extravasated into the interstitial spaces of the intestinal wall. Histologically, there was complete autolysis. This group was reclassified as type III; all eight were not predicted to survive; all died. The fluorescent method is much more reliable than conventional clinical predictors or survival following intestinal ischemia; the second-look procedure is a valuable part of the technique.

7478 THE USE OF GLUCAGON IN THE DIAGNOSIS AND MANAGEMENT OF ILEOCOLIC INTUSSUSCEPTION. (Eng.) Hoy, G. R.; Dunbar, D.; Boles, E. T., Jr. (Ohio State Univ. Coll. Medicine, Columbus, OH). *J. Pediatr. Surg.* 12(6):939-944; 1977.

Experience with barium enema supplemented by glucagon in the diagnosis and treatment of 44 pediatric patients with suspected ileocolic intussusception is presented. Glucagon was given 5-20 min prior to the examination in a dose of 0.05 mg/kg either i.m. or i.v. Reduction of intussusception by the barium enema hydrostatic technique was accomplished in 21 of the 25 cases of intussusception. In 15 of the 21 patients, successful reduction was achieved on the first examination; in the other 6, it was achieved on the second examination. The second examinations were necessary because of mechanical problems in the apparatus or the catheter. Free reflux of barium into the terminal ileum was readily obtained in all these patients. The effect of glucagon on the comfort of the patient was assessed in 39 patients. Nineteen were completely cooperative and comfortable during the examination. Fourteen had some discomfort and were less cooperative, but the examination was not compromised. Only six patients were very uncomfortable and uncooperative. No serious complications or adverse reactions occurred in any patient. The use of glucagon in barium enema examinations seems to enhance the comfort of the patient and the ease of colon and small bowel filling.

7479 THE USE OF PRONE FILMS FOR SUSPECTED BOWEL OBSTRUCTION IN INFANTS AND CHILDREN. (Eng.) Lorenzo, R. L.; Harolds, J. A. (Medical Univ. South Carolina, 80 Barre St., Charleston, SC 29401). *Am. J. Roentgenol.* 129(4):617-622; 1977.

The value of prone films of the abdomen, both frontal and cross-table lateral, in the differentiation of obstructive versus nonobstructive ileus is illustrated by six case reports of infants and children. In two cases, supine and upright films showed evidence of obstruction; however, prone and cross-table lateral films in the first case and prone films in the second demonstrated a normal amount of air in the rectum and excluded intestinal obstruction. In three other patients, in whom the supine and upright films showed distended bowel loops and air-fluid levels, the prone and/or cross-table lateral films showed no air in the rectum, thus suggesting obstruction. Meconium ileus, stricture secondary to necrotizing enterocolitis, and ileus secondary to a left inguinal hernia were subsequently diagnosed in these patients. In the remaining patient, the plain supine and upright views demonstrated distended bowel loops and air-fluid levels. A prone film showed air in a rectum of abnormal caliber, and a plain film diagnosis of low segment aganglionic megacolon was made. Barium

enema and the findings at surgery confirmed this diagnosis. These observations show that prone and lateral decubitus films are useful in evaluating the gas in the large bowel, particularly in the rectum. The level of obstruction, as well as differentiation between obstructive and nonobstructive ileus, can be determined by this plain-film approach.

7480 PANCREATIC ENZYMES IN HUMAN DUODENAL JUICE--A COMPARISON OF RESPONSES IN SECRETIN PANCREOZYMIN AND LUNDH BORGSTROM TESTS. (Eng.) Braganza, J. M.; Herman, K.; Hine, P.; Kay, G.; Sandle, G. I. (Manchester Royal Infirmary, Manchester, England). *Gut* 19(5):358-366; 1978.

The concentrations and total outputs of trypsin, amylase, and lipase secreted into the duodenum during secretin pancreozymin and Lundh Borgstrom tests were assessed in 12 patients without pancreatic disease and 3 normal subjects to assess the relative intensity of pancreatic stimulation provided by these means. The mean concentration of trypsin and the mean 10-min total output of trypsin, amylase, and lipase after the meal (though less than the peak postprandial responses) were equal to the respective peak enzyme responses after the i.v. injection of 2 Crick Harper Raper U/kg of secretin Boots and after the i.v. injection of 2 Crick Harper Raper U/kg of pancreozymin Boots.

7481 THE USE OF PROSTAGLANDIN F2-ALPHA IN SELECTIVE PANCREATIC AND LEFT GASTRIC ANGIOGRAPHY. (Eng.) Legge, D. (Mater Misericordiae Hosp., Dublin, Ireland). *Clin. Radiol.* 29(3):285-288; 1978.

Prostaglandin F_2-alpha was used in 10 superselective angiographic studies of the pancreas for suspected carcinoma and 10 left gastric studies for suspected portal hypertension to improve anatomic detail and diagnostic accuracy. The injection of prostaglandin (60 μg) into the dorsal pancreatic or gastroduodenal artery increased opacification of small pancreatic vessels and better demonstrated the angiographic changes in all three patients who were found to have carcinoma of the pancreas. Injection of the drug into the left gastric artery increased opacification of the left gastric vein, allowed identification of the direction of flow of the contrast medium, and enhanced demonstration of gastroesophageal varices in the five patients in whom these were present. It is concluded that prostaglandin improves the quality of pancreatic and left gastric angiographic studies.

7482 ENDOSCOPIC ASPIRATION BIOPSY OF THE PANCREAS. (Eng.) Tsuchiya, R.; Henmi, T.; Kondo, N.; Akashi, M.; Harada, N. (Nagasaki Univ. Sch. Medicine 7-1, Sakamoto-Machi, Nagasaki City, Nagasaki, Japan). *Gastroenterology* 73(5):1050-1052; 1977.

The diagnostic accuracy of endoscopic aspiration biopsy in malignancies of the periampullary region and the pancreas was assessed retrospectively in 51 patients. Biopsy is carried out with a side-viewing duodenal or gastric fiberscope and a newly designed biopsy needle. The needle consists of a guide tube and an inner tube made of Teflon. The guide tube for the gastrofiberscope is 1,542 mm long, and that for the duodenofiberscope is 1,790 mm. A 7-mm long 23-gauge metal needle is used for the gastrofiberscope, and a 6-mm long 26-gauge needle for the duodenofiberscope. Malignant cells were identified in 21 of 25 patients with carcinoma, making the overall diagnostic accuracy 84.0%. Malignant cells were diagnosed in 8 of 10 patients with pancreatic malignancy who underwent transduodenal aspiration biopsy, but not gastric biopsy. The false-negative diagnoses were made in patients with carcinoma of the body and tail of the pancreas. Malignancy was diagnosed in 10 of the 11 patients with cancer who underwent transgastric aspiration biopsy alone. In the patient in whom the correct diagnosis was missed, well-differentiated adenocarcinoma cells were thought to be benign atypical cells. Pancreatic carcinoma was correctly diagnosed in all four patients who underwent both gastric and duodenal biopsy. There were no false-positive diagnoses, and no complications attributed to the procedure were encountered. Endoscopic aspiration biopsy is valuable in the diagnosis of pancreatic carcinoma.

7483 CYSTIC FIBROSIS SCREENING IN THE NEWBORN. (Eng.) Crossley, J. R.; Berryman, C. C.; Elliott, R. B. (Sch. Medicine, Univ. Auckland, 85 Park Rd., Auckland 3, New Zealand). *Lancet* 2(8048):1093-1095; 1977.

An improved colorimetric method for trypsin assay in stool samples as a test for cystic fibrosis in newborns is described, and the results of the method in consecutive neonates are reported. A colorless substrate, benzoyl-arginine-*p*-nitroanilide (BAPNA), releases yellow *p*-nitroaniline when hydrolyzed by trypsin. Stool samples from infants with cystic fibrosis, who lack trypsin, give negligible color. Among 4,500 newborns screened by this method, 2 were found to have cystic fibrosis. The method was also tested in five other untreated children known to have the disease, and the solutions had no yellow tint whatever. In 2,500 consecutive samples in which D,L-BAPNA was used as substrate, the frequency of positive results after a single assay was 3.2%. Reassay of these samples gave a second specimen-request rate of 30/2,500. When the second specimens were assayed, 27 gave normal results, but 3 showed low enzyme activity. By quantitative assay of a stool specimen, one of these babies was shown to have normal enzyme activity, but that the other two had no enzyme activity. The diagnosis of cystic fibrosis was confirmed by a sweat test. When 13 consecutive specimens that had twice given false-positive results (no color) with D,L-BAPNA (0.5 mg/test) were assayed with L-BAPNA (0.25 mg and 0.5 mg/test), 11 of 13 and 12 of 13, resp., gave normal results. The authors are now screening with 0.25 mg L-BAPNA test and reassaying with 0.25 mg and 0.5 mg/test; the frequency of positive results is now 0.4% after

one assay, reducing to 0.1% after reassay of the same specimen (2,000 samples). There has been no evidence of false-negative results.

7484 PANCREATIC INJURY FOLLOWING ERCP: FAILURE OF PROPHYLACTIC BENEFIT OF TRASYLOL. (Eng.) Brust, R.; Thomson, A. B. R.; Wensel, R. H.; Sherbaniuk, R. W.; Costopoulos, L. (Univ. Alberta Hosp., Edmonton, Alberta, Canada). *Gastrointest. Endosc.* 24(2):77-79; 1977.

The value of Trasylol in the prevention of pancreatitis following endoscopic retrograde cholangiopancreatography (ERCP) was tested in 61 patients in a double-blind randomized study. Postprocedural hyperamylasemia occurred in 66% of cases within 2 hr, and in 57% the elevations in amylase persisted for 24 hr after the procedure. Elevated urinary amylase levels were found in 34% of patients. Symptoms attributable to the procedure occurred in 39%. The frequency of clinical and biochemical changes was unrelated to the duration of the procedure (10 min-3 hr), the number of ducts cannulated, or abnormalities in the ducts. The administration of Trasylol (200,000 U, i.v.) 2 hr before and 6, 12, 18, and 24 hr following ERCP failed to prevent or significantly reduce the frequency or magnitude of elevations in serum or urine amylase activity or to prevent postexamination abdominal pain.

7485 THE USE OF PROSTAGLANDIN E_1 FOR ENHANCED VISUALIZATION OF THE SPLANCHNIC CIRCULATION. (Eng.) Jonsson, K.; Wallace, S.; Jacobson, E. D.; Anderson, J. H.; Zornoza, J.; Granmayeh, M. (M. D. Anderson Hosp. Tumor Inst., Houston, TX 77030). *Radiology* 125(2):373-378; 1977.

Clinical experience with prostaglandin E_1 (PGE_1) as an aid in enhancing portal vein visualization and its use in angiography of the liver and pancreas are reported. When a single bolus injection of PGE_1 (5-7.5 µg except for 2.5 µg in a 5-yr-old child) was given into the superior mesenteric artery (SMA), hepatic artery (HA), or dorsal pancreatic artery (DPA) in 22 patients, the normal injection rates for contrast medium were increased somewhat, but the pain and sensation of heat accompanying this injection were identical to the case without PGE_1. PGE_1 injection itself did not produce discomfort or significant pulse rate or arterial blood pressure changes in the patients. PGE_1 injection dilated the arteries slightly and markedly increased blood flow; less reflux of contrast medium into adjacent arteries was noted. The quality of portal vein opacification was greatly improved in all patients in whom the comparison was made: initial and optimal opacification occurred at a mean of 5 and 10 sec, resp., with PGE_1 and 13 and 19 sec, resp., without PGE_1. The increased injection rate (14 ml/sec for 3 sec) gave additional information in one hepatic angiogram in which a hypervascular metastatic lesion was demonstrated. In another patient, the injection of PGE_1 and contrast medium (6 ml/sec for 5 sec) into the DPA demonstrated a tumor in the tail of the pancreas as a filling defect. In seven patients, the parenchymal staining of the liver after SMA injection of PGE_1 and contrast medium showed filling defects corresponding to metastases or primary tumor in the liver. The use of PGE_1 markedly improves venous filling in splanchnic angiography.

7486 RESULTS OF TRANSJUGULAR ANTEGRADE CHOLANGIOGRAPHY AND RETROGRADE PORTOGRAPHY. (Ger.) Thelen, M.; Paquet, K. J.; Schulz, D.; Herpertz, C. (Radiologische Klinik, Universitat Bonn, Bonn, W. Germany). *Roentgenblaetter* 30(10):508-519; 1977.

Transjugular antegrade cholangiography, liver biopsy, and retrograde portography are described. Transjugular cholangiography is indicated in intrahepatic or extrahepatic flow obstruction if i.v. or infusion cholangiography or endoscopic retrograde cholangiography are unsuccessful or unfeasible. Transjugular cholangiography was performed in 19 patients; it was successful in 16: stricture of a hepatojejunostomy was diagnosed in 5 cases, stricture of bile duct in 2, carcinoma of the common or hepatic bile ducts in 4, and iatrogenic stricture of the hepatic duct, stricture of the papilla, liver cirrhosis, chronic pancreatitis with stricture of the common bile duct, and compression of the hepatic duct by lymph node in 1 case each. Complication (injection under the hepatic capsule) occurred in one case only. Transjugular liver biopsy is indicated if transcutaneous biopsy or laparoscopy are unfeasible, and it is contraindicated (as is transjugular cholangiography) in hepatic echinococcosis, large liver abscess, and acute cholangitis. It was performed in 17 patients, and it was successful in 15. Hepatitis was diagnosed in two cases, liver carcinoma in one, liver fibrosis in six, liver cirrhosis in three, and cholestasis in three. Transjugular retrograde portography was performed in 41 patients with the clinical picture of liver fibrosis (4 cases), liver cirrhosis (25 cases), and intrahepatic space-occupying process (12). Liver cirrhosis with portal hypertension was diagnosed by transjugular portography in 29 cases, liver fibrosis in 4, echinococcosis in 3, and liver carcinoma in 5.

7487 PERITONEOSCOPY FOR THE DIAGNOSIS OF LEFT LOBE LESIONS OF THE LIVER. (Eng.) Whitcomb, F. F., Jr.; Gibb, S. P.; Boyce, H. W., Jr. (Lahey Clinic Foundation, 605 Commonwealth Ave., Boston, MA 02215). *Arch. Intern. Med.* 138(1): 126-127; 1978.

The effectiveness of peritoneoscopy and direct vision liver biopsy were evaluated in 38 selected patients with focal lesions that had been detected by liver scan and were located predominantly in the left lobe or in the left portion of the right lobe where percutaneous blind biopsy was negative or nondiagnostic. ^{99m}Tc-sulfur colloid scans were performed because of hepatomegaly or abnormal liver function test results or both. Peritoneoscopy was successful in establishing the diagnosis in 36 of the 38 patients. The failures were due to uncooperativeness in one case and to adhesions

from a previous operation that obscured the visibility in the other. Of the 36 patients, 30 had metastases that were clearly visible, 2 had Hodgkin's disease, 2 had thin left lobes, and 1 each had postnecrotic cirrhosis and polycystic disease. Two major complications were encountered: one patient had a decrease of hematocrit and required two transfusions although excessive bleeding had not been apparent immediately after the biopsy and another patient with Hodgkin's disease had postoperative fever and ileus (believed to be secondary to localized perforation of the bowel and peritonitis) that responded to antibiotics and i.v. fluids. Peritoneoscopy and direct vision liver biopsy are simple, safe, and accurate methods for the documentation of focal lesions involving predominantly the left lobe or the left portion of the right lobe of the liver.

7488 IMPROVEMENT IN VISUALIZATION OF HEPATIC LESIONS WITH UPRIGHT VIEWS. (Eng.) Mettler, F. A.; Shea, W. H., Jr.; Guiberteau, M. J.; Potsaid, M. S. (Cancer Res. Treatment Center, Univ. New Mexico, Albuquerque, NM 87131). *J. Nucl. Med.* 18(11):1128-1130; 1977.

To improve radiocolloid images of the liver by reducing the liver respiratory excursions, standing scintiphoto views of the liver were compared with conventional supine scans by a computer technique that was used to analyze and display the results. Patients and healthy volunteers were given 4 mCi of ^{99m}Tc sulfur colloid and scanned in both positions. In one patient with known hepatic metastases from lymphoma, the standard supine anteroposterior (AP) views alone would have resulted in a normal interpretation of the radionuclide scan, whereas the upright AP views were diagnostic (both views were considered along with gray-scale sonograms taken in each position the same day). Computer analysis of radiocolloid activity in the horizontal and vertical axes centered on a particular defect in a patient with known hepatic metastases from colon carcinoma demonstrated that the standing view gave better delineation of the lesion than did the supine view. Computer analysis of end-inspiration and end-expiration scans performed on normal volunteers showed that respiratory motion of the liver is approximately equal (2 cm) in the supine, prone, and sitting positions but is markedly decreased (0.5 cm) in the standing position. The standing position should be employed whenever maximal sensitivity for small focal defects is desired.

7489 EVALUATION OF BILIARY TRACT DISEASE BY DIAGNOSTIC ULTRASOUND. (Eng.) Lawson, T. L. (George Washington Univ. Medical Center, 901 23 St., NW, Washington, DC 20037). *Am. J. Dig. Dis.* 22(9):820-828; 1977.

The diagnosis of cholelithiasis and of biliary obstruction using ultrasound is reviewed. Gallstones produce three basic ultrasonographic appearances: focal, linear, or diffuse internal echoes; gallbladder wall contour irregularities of increased sonic density; and sonic shadowing. Focal internal echoes are usually caused by large gallstones (>0.5-1 cm diameter). Smaller, multiple gallstones may layer and float in the bile, giving a linear area of sonic density with the gallbladder. If aggregates of small gallstones sink to the dependent wall of the gallbladder, they are seen as an area of gallbladder wall irregularity of increased sonic density. Sonic shadows are not seen in every case of cholelithiasis, but when shadowing occurs in conjunction with internal echoes or contour irregularities, diagnostic confidence is increased. Sonic shadowing from stones is usually focal when seen in both longitudinal (sagittal) and transverse scans; this shadowing can be distinguished from that produced by gas or barium within the hepatic flexure, because the latter is usually more diffuse. Cholecystosonography is reliable, with an overall accuracy of approximately 90%, a low composite false-positive rate of about 1 or 2%, and a false-negative rate of approximately 5-10%. Dilated bile ducts can be visualized by ultrasonography and usually appear as reticular or branching sonolucencies within the liver parenchyma. Dilated bile ducts can be differentiated from hepatic veins, because hepatic veins become less prominent in the periphery and most prominent as they enter the vena cava in the region of the right atrium. When dilated bile ducts are seen, the diagnosis of extrahepatic biliary obstruction can be made with the exception of the unusual circumstance where there has been previous biliary disease and persistent postoperative dilation. Gallbladder diameter is not a good or reliable sign of extrahepatic biliary obstruction because of the great variabilities of gallbladder diameter in both diseased and normal conditions. Nevertheless, in the proper clinical setting, a gallbladder diameter of 4 cm or greater usually indicates pathologic gallbladder dilation and biliary obstruction.

7490 PANCREATIC SCANNING USING RETROGRADE INJECTION OF TECHNETIUM-99m-LABELED COMPOUNDS. (Eng.) Varley, P. F.; Silvis, S. E.; Shafer, R. B. (Veterans Admin. Hosp., 54th St. and 48th Ave. S., Minneapolis, MN 55417). *J. Nucl. Med.* 18(7):676-679; 1977.

7491 BALLOON OCCLUSION OF SEGMENTAL HEPATIC ARTERIES: CONTROL OF BIOPSY-INDUCED HEMOBILIA. (Eng.) Dunnick, N. R.; Doppman, J. L.; Brereton, H. D. (Diagnostic Radiology Dept., Building 10, Room 6S211, Clinical Center, Natl. Inst. Health, Bethesda, MD 20014). *JAMA* 238(23): 2524-2526; 1977.

7492 ENDOSCOPIC EVALUATION OF SMALL-BOWEL LEUKEMIA. (Eng.) Wasser, A. H.; Spector, J. I. (Berkshire Medical Center, 725 North St., Pittsfield, MA 01201). *Am. J. Dig. Dis.* 22(11): 1028-1032; 1977.

7493 OPTIMUM VISCOSITY OF BARIUM SUSPENSION FOR USE IN THE DOUBLE CONTRAST BARIUM

MEAL. (Eng.) Cumberland, D. C. (Northern General Hosp., Sheffield S5-7AU, England). *Gastrointest. Radiol.* 2(2):169-174; 1977.

7494 MENGHINI NEEDLE FRACTURE AFTER ATTEMPTED LIVER BIOPSY. (Eng.) Purow, E.; Grosberg, S. J.; Wapnick, S. (Veterans Admin. Hosp., Brooklyn, NY 11209). *Gastroenterology* 73(6):1404-1405; 1977.

7495 THE POSSIBLE ROLE OF THE CARCINOEMBRYONIC ANTIGEN (CEA) AND OTHER CARCINOFETAL ANTIGENS IN MALIGNANT AND BENIGN DISEASES OF THE GASTROINTESTINAL TRACT. (Eng.) von Kleist, S. (Institut de Recherches Scientifiques sur le Cancer, Laboratoire d'Immunochimie, F-94800 Villejuif, France). *Z. Krebsforsch. Klin. Onkol.* 90(1):1-11; 1977.

7496 MOTION CORRECTED HEPATIC SCINTIGRAPHY: AN OBJECTIVE CLINICAL EVALUATION. (Eng.) Turner, D. A.; Fordham, E. W.; Ali, A.; Rubin, P. D.; Muerhrcke, R. C.; Oppenheim, B. E.; *et al.* (Rush-Presbyterian-St. Luke's Medical Center, 1753 W. Congress Parkway, Chicago, IL 60612). *J. Nucl. Med.* 19(2):142-148; 1978.

7497 DIFFERENTIAL HISTOLOGICAL DIAGNOSIS OF GROUND GLASS CELLS BY TRICHROME STAINING. (Eng.) Gubetta, L.; Rizzetto, M.; Actis, G. C.; Verme, G. (Ospedale Mauriziano, Cs. Turati 46, 10128 Torino, Italy). *Pathologica* 69(995/996): 485-489; 1977.

7498 THE CLINICAL LABORATORY AND THE ESOPHAGUS. (Eng.) Silber, W. (Medical Sch., Univ. Cape Town, Cape Town, South Africa). *Curr. Surg.* 35(1):2-13; 1978.

7499 RISK OF IONIZING RADIATION [Abstract]. (Eng.) Mozsik, Gy. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):30-31; 1977.

7500 URINARY EXCRETION AND PATTERNS OF PROTEIN BINDING OF IODIPAMIDE (BILIGRAFIN FORTE): A COMPARISON OF THE INFUSION TECHNIQUE WITH THE SINGLE BOLUS INJECTION IN INTRAVENOUS CHOLANGIOGRAPHY. (Eng.) Husband, J.; Saxton, H. M. (Royal Marsden Hosp., Downs Rd., Sutton, Surrey SM2 5PT, England). *Br. J. Radiol.* 51(601):11-16; 1978.

7501 A SIMPLE SPECTROPHOTOMETRIC METHOD FOR MEASURING BILIARY IOGLYCAMIDE (BILIGRAM) CONCENTRATION. (Eng.) Bell, G. D.; McMullin, J.; Oliver, J.; McAlister, J. (City Hosp., Hucknell Rd., Nottingham, England). *Br. J. Radiol.* 51(601):17-19; 1978.

7502 THE RISK OF OESOPHAGOSCOPY AND GASTROSCOPY [Abstract]. (Eng.) Hafter, E. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):12-14; 1977.

See also, 7279, 7316, 7362, 7371, 7466, 7503, 7507, 7508, 7533, 7547, 7548, 7550, 7559, 7629, 7636, 7643, 7662, 7665, 7666, 7669, 7674, 7677, 7700, 7701, 7718, 7737, 7741, 7744, 7751, 7756, 7757, 7758, 7765, 7766, 7767, 7768, 7769, 7779, 7780, 7783, 7791, 7794, 7798, 7810, 7811, 7839, 7841, 7869, 7870, 7871, 7872, 7874, 7884, 7885, 7887, 7890, 7892, 7895, 7905, 7906, 7907, 7908, 7912, 7939, 7943, 7944, 7949, 7961, 7962, 7968, 7969, 7972.

GASTROINTESTINAL DISEASES

ESOPHAGUS

7503 RADIOLOGIC SPECTRUM OF OPPORTUNISTIC INFECTIONS OF THE UPPER GASTROINTESTINAL TRACT. (Eng.) Athey, P. A.; Goldstein, H. M.; Dodd, G. D. (M. D. Anderson Hosp. and Tumor Inst., Houston, TX 77030). *Am. J. Roentgenol.* 129(3):419-424; 1977.

The pathogenesis, clinical aspects, pathologic findings, and radiologic features in 34 patients with opportunistic infections of the esophagus and/or stomach are discussed. Most patients had hematologic disorders, with leukemia the underlying diagnosis in 19 patients. Most had more than one predisposing factor, since virtually all were receiving some form of chemotherapy, corticosteroids, and/or antibiotics. Only one patient, who had gastric candidiasis, had no known predisposing factors. The most common presenting symptoms were dysphagia and/or substernal pain or burning. Because of the debilitated clinical state of the patients, the diagnosis of opportunistic infection was often based solely on clinical findings and radiologic examination, and in only a few was an organism actually cultured. In approximately half the patients, *Candida albicans* was cultured from the oropharynx, urine, and/or blood. In two additional patients, there was evidence of a *Klebsiella* infection. Abnormal esophageal motility was the most common radiologic finding and was present in 33 patients with esophagitis. Abnormal motility was the sole initial finding with no morphologic abnormalities in only two patients. The majority of cases demonstrated a slightly dilated, virtually atonic esophagus. In most instances, the morphologic changes involved the entire thoracic esophagus, although in approximately one-third of the cases, the proximal half was relatively spared even when oropharyngeal manifestations were present. A shaggy marginal contour was observed radiologically in most cases of opportunistic esophagitis. Thickening and irregularity of the mucosal folds, simulating the appearance of varices, reflected the severity of the inflammatory changes. A continuing severe inflammatory reaction lead to frank stricture in one patient. Two patients demonstrated the unusual finding of one or several large nodular filling defects in the esophagus representing "fungus balls" due to candidiasis. Two patients had gastric monilial infection, and in one, the "fungus ball" appearance was noted in the esophagus, stomach, and duodenum. Both patients were seen radiologically to have several raised nodular lesions scattered about the stomach, and most nodules had central ulcerations giving the target appearance.

7504 GASTRIC EMPTYING IN PATIENTS WITH REFLUX ESOPHAGITIS OR BENIGN STRICTURES OF THE ESOPHAGUS SECONDARY TO REFLUX COMPARED TO CONTROLS. (Eng.) Csendes, A.; Henriquez, A. (Hosp. J. J. Aguirre, Univ. Chile, Santiago, Chile). *Scand. J. Gastroenterol.* 13(2):205-207; 1978.

To elucidate the pathogenesis of reflux esophagitis, gastric emptying of liquids was measured in 12 patients with reflux esophagitis, 7 patients with benign esophageal strictures secondary to reflux, and 11 healthy controls. Lower esophageal sphincter pressure and gastric pH were simultaneously determined as well. The solutions used were phenol red (30 mg/l) in 150 mM NaCl (solution A), phenol red (500 mg/l) in 150 mM NaCl (solution B), and 150 mM NaCl (solution C) and were given by intubation after a 12-hr fast. The stomach was fully emptied by aspiration, 750 ml of solution A was instilled over 1-3 min, an 8-ml sample was taken at 10 min, 20 ml of solution B was added and vigorously mixed for 45 sec, and a second sample was taken. A similar procedure was followed at 20, 30, 45, 60, and 90 min using 15, 10, 10, 10, and 5 ml of solution B, resp. At 120 min, a sample was taken, 200 ml of solution C were added for 45 sec, and a final sample taken. No significant differences were found among the test groups with respect to half-time of gastric emptying, although there was a slight tendency toward slower emptying in the patients with benign strictures. There were also no significant differences among the test groups with respect to gastric emptying time (<10 ml of the instilled volume remaining in the stomach) or with respect to the emptying curve (the volume of instilled solution remaining at the various sampling time points). Gastric retention does not appear to be an important factor in the production either of reflux or of strictures.

7505 ASSOCIATION OF ASPIRIN INGESTION WITH SYMPTOMATIC ESOPHAGEAL HIATUS HERNIA. (Eng.) Smith, V. M. (301 Saint Paul Place, Baltimore, MD 21202). *South. Med. J.* 71(Suppl. 1):45-47; 1978.

Radiographic studies were carried out to test the hypothesis that esophagitis in patients with hiatal hernia can be caused by delays in the passage of ingested aspirin from mouth to stomach. Barium-filled pouches of esophageal hiatal hernia were shown to trap barium above the diaphragm for prolonged periods despite repeated swallows of water or additional barium suspension. Swallowed barium sulfate tablets were shown to pass through the esophagus into the stomach within seconds in normal subjects. In patients with esophageal hiatal hernia, however, the tablets frequently remained within the esophagus, sometimes shifting up and down within the esophagus, for prolonged periods before entering the stomach. In other patients, the tablets stayed at the esophagogastric junction for the entire observation period of 5 to 15 min before entering the stomach. In another experiment, a 5-g aspirin tablet placed in the buccal space below the lower central incisor teeth for 15 min produced a slightly raised lesion. Leaving a tablet in place for 2 hr resulted in the development of an area of intense erythema and fri-

ability. Eighteen hours later, the gingiva in the area displayed erythema, edema, and friability, demonstrating that aspirin can corrode alkaline mucosa in the absence of acid.

7506 ESOPHAGEAL BLEEDING. (Eng.) Myers, R. T. (Bowman Gray Sch. Medicine, Wake Forest Univ., Winston-Salem, NC). *Hosp. Med.* 14(2):80-104, *passim*; 1978.

7507 RISK OF GASTRIC AND SMALL BOWEL INTUBATION. (Eng.) Watkinson, G. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):14-17; 1977.

7508 EMERGENCY UPPER GASTROINTESTINAL ENDOSCOPIES. (Eng.) Spellberg, M. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):19-20; 1977.

7509 THE TREATMENT OF BENIGN STRICTURES IN THE DISTAL PORTION OF THE OESOPHAGUS. (Eng.) Blok, C.; Van Elk, P. J. (St. Geertruiden Gasthuis of Ziekenhuis, Deventer, Netherlands). *Arch. Chir. Neerl.* 29(4):239-248; 1977.

7510 COMBINED ESOPHAGEAL AND DUODENAL ATRESIA WITHOUT TRACHEOESOPHAGEAL FISTULA: CHARACTERISTIC RADIOGRAPHIC CHANGES. (Eng.) Crowe, J. E.; Sumner, T. E. (Bowman Gray Sch. Medicine, Wake Forest Univ., 300 S. Hawthorne Rd., Winston-Salem, NC 27103). *Am. J. Roentgenol.* 130(1):167-168; 1978.

7511 SIMPLIFIED HIATUS HERNIORRHAPHY. (Eng.) Lally, J. J.; Gist, W. W.; Petit, C. A. (Kansas City General Hosp. and Medical Center, Kansas City, MO). *Abdom. Surg.* 19(4):99-101; 1977.

7512 CARCINOMA OF THE ESOPHAGUS. (Eng.) Hutchinson, W. B., Jr.; Hutchinson, W. B. (U.S. Naval Hosp., Long Beach, CA). *Ann. Surg.* 43(11):709-714; 1977.

7513 ANGIOGRAPHIC DEMONSTRATION OF ESOPHAGOGASTRIC BLEEDING FROM THE INFERIOR PHRENIC ARTERY. (Eng.) Smith, D. C.; Kitching, G. B. (Loma Linda Univ. Medical Center, Loma Linda, CA 92354). *Radiology* 125(3):613-614; 1977.

7514 THE SO-CALLED PRE-CANCEROUS LESIONS OF THE ESOPHAGUS. (Eng.) Messinetti, S.; Montori, A.; di Curzio, B.; Viceconte, G.; Stio, F. (III Clinica Chirurgica, Centro di Endoscopia Digestiva, Universita di Roma, Rome, Italy). *Rend. Gastroenterol.* 9(2):127-136; 1977.

7515 LOWER ESOPHAGEAL SPHINCTER AS A BARRIER TO GASTROESOPHAGEAL REFLUX BEFORE AND AFTER ANTIREFLUX SURGERY. (Eng.) Fisher, R. S. (Temple Univ. Sch. Medicine, Philadelphia, PA 19140). *South. Med. J.* 71(Suppl. 1):22-25; 1978.

7516 EFFICACY OF MEDICAL MANAGEMENT OF GASTROESOPHAGEAL REFLUX: A CRITICAL ASSESSMENT. (Eng.) Hollander, D.; Karris, G. (Wayne State Univ. Sch. Medicine, 540 E. Canfield, Detroit, MI 48201). *South. Med. J.* 71(Suppl. 1):41-42; 1978.

7517 TRACTION DIVERTICULUM OF THE ESOPHAGUS DUE TO FOREGUT CYST. (Eng.) Rosenlund, M. L.; Chatten, J.; Schnaufer, L. (Univ. Pennsylvania Sch. Medicine, 34th and Civic Center Blvd., Philadelphia, PA 19104). *J. Pediatr.* 92(2):338-339; 1978.

7518 ESOPHAGEAL RUPTURE IN A PREMATURE INFANT. (Eng.) Khanna, N. N.; Wijesekera, S.; Cushmore, F. N.; Schell, F. R. (St. John's Hosp., 800 E. Carpenter St., Springfield, IL 62702). *J. Pediatr.* 92(4):641-642; 1978.

7519 AN ANALYSIS OF RECURRENT ESOPHAGITIS FOLLOWING POSTERIOR GASTROPEXY. (Eng.) Maher, J. W.; Hollenbeck, J. I.; Woodward, E. R. (Coll. Medicine, Univ. Florida, Gainesville, FL 32610). *Ann. Surg.* 187(3):227-230; 1978.

7520 UPPER-ESOPHAGEAL SPHINCTER DYSFUNCTION: PATHOGENESIS AND TREATMENT. (Eng.) Hurwitz, A. L.; Duranceau, A. (Veterans Admin. Hosp., 4150 Clement St., San Francisco, CA 94121). *Am. J. Dig. Dis.* 23(3):275-281; 1978.

See also, 7315, 7470, 7473, 7498, 7502, 7565, 7601, 7613, 7617, 7860, 7862, 7865, 7911, 7935.

STOMACH

7521 PYLORIC ANTRAL MUCOSAL WEBS. (Eng.) Feliciano, D. V.; van Heerden, J. A. (Mayo Graduate Sch. Medicine, Univ. Minnesota, Rochester, MN). *Mayo Clin. Proc.* 52(10):650-653; 1977.

The current literature on pyloric antral mucosal webs is reviewed, and the symptoms, treatment, and results of treatment of seven patients are presented. The incidence of this defect is low. It is unknown

whether it is congenital or acquired. The small series presented contributes little to resolving this controversy; however, three cases had documented normal gastric roentgenograms with subsequent appearance of the antral webs on more recent roentgenograms. The presenting features in infants include persistent postprandial non-bile stained vomiting and secondary failure to thrive. Adults present with postprandial fullness and/or epigastric pain, with relief by vomiting. Standard gastric roentgenograms with barium reveal thin, constant septa or bands about 1-2 cm proximal to the pyloric ring seen as radiolucent lines projecting into the center of the antral lumen from the greater and lesser curvatures of the prepyloric antrum. Other antral-pyloric lesions that must be distinguished from antral webs include redundant gastric mucosa, hypertrophic gastric rugae, distal gastrospasm, cholecystogastrocolic bands, cicatricial post-ulcer scarring, and heterotopic pancreatic tissue. Antral webs may be difficult to visualize endoscopically, as in one of the presented cases in which two separate procedures were required. The endoscope can usually pass down to, and occasionally through, the central aperture of the diaphragm into the pyloric channel. Lysis of the web together with gastroplasty resulted in cure in the three patients in whom these procedures were performed, and finger fracture of the web together with pyloromyotomy and removal of ectopic pancreatic tissue were successful in a fourth. The other three patients in the series were asymptomatic and received no treatment. Surgical treatment is recommended for patients with obstruction.

7522 MULTIPLE BIOGENIC AMINE-SECRETING 'CARCINOID' TUMOUR OF THE STOMACH: A CASE REPORT. (Eng.) Bader, L. V.; Lykke, A. W. J.; Hinterberger, H. (St. George Hosp., Kogarah 2217, New South Wales, Australia). *Pathology* 9(4):353-358; 1977.

An unusual case of gastric carcinoid tumor producing multiple biogenic amines is described in a patient with pernicious anemia. The patient was a 59-yr-old man who presented with a 3-month history of anorexia, abdominal discomfort, and clinical symptoms and signs of pernicious anemia. Anorexia and abdominal discomfort persisted after the patient was started on therapy for anemia, and epigastric tenderness was present. Gastroscopy revealed atrophic gastritis and a polypoid lesion, which was situated at the level of the mid-body on the greater curvature. The lesion had histological features of a carcinoid tumor or a related form of polypeptide "APUDoma." The serum glucagon levels were normal, but serum gastrin was greatly increased (2,650 ± 300 pM). Histopathological examination of the tumor, resected at laparotomy, showed uniform cells arranged partly in a trabecular pattern and partly forming solid masses. Ultrastructural examination showed that the neoplastic cells were tightly packed and irregularly polyhedral with well-defined cell and nuclear membranes. Two forms of secretory granules were identified, one being intensely electron dense and homogeneous and the other less dense with a vague and irregularly electron-lucent internal structure. Both forms of granules were bound by irregular limiting membranes, and the electron-dense variety was the most prevalent. The tumor contained the following biogenic amines: norepinephrine (26.8 µg/g), epinephrine (7.9 µg/g), and 5-hydroxytryptamine (1.1 µg/g). The tumor gastrin concentration was 5,000 pg/g. Carcinoid tumors may be associated with a wide variety of clinical syndromes and the production of biogenic amines or polypeptides or a combination of these products.

7523 THE TWO HISTOLOGICAL TYPES OF GASTRIC CARCINOMA IN NORTHERN NIGERIA. (Eng.) Mabogunje, O. A.; Subbuswamy, S. G.; Lawrie, J. H. (Ahmadu Bello Univ. Teaching Hosp., Zaria, Nigeria). *Gut* 19(5):425-429; 1978.

The proportion of two histological types of gastric carcinoma (intestinal type, characterized by the formation of glandular structures and islands and the diffuse type, with cells tending to separate and infiltrate individually) was investigated in 65 specimens from Northern Nigerian patients. Forty tumors were intestinal, 16 were diffuse, 2 were mixed, and 7 were unclassifiable. The intestinal type occurred with equal frequency as the diffuse type with regard to age group and sex distribution.

7524 CARCINOMA OF THE STUMP AFTER GASTRIC RESECTION FOR GASTRIC ULCER AND ADENOMATOUS POLYPS. (Ger.) Wanzjan, E. N.; Astrozhnikov, Y. V.; Tschernousov, A. F. (All Union Res. Inst. for Clinical and Experimental Surgery, B. Pirogovskaja 2/6, 119874 Moscow, USSR). *Zentralbl. Chir.* 102 (22):1358-1364; 1977.

Primary carcinoma of gastric stump was found in 39 patients who had undergone gastric resection for ulcer or for solitary or multiple adenomatous polyps. Thirty-five patients underwent surgery for gastric stump carcinoma; the surgery was radical in 21. Extirpation of the gastric stump was performed in 12 patients and subtotal or combined subtotal resection in 9. Palliative surgery was performed on four patients, and the others had exploratory laparotomy. The postoperative mortality was 4/35. Five patients died during the first 2 yr after surgery, five survived 2 yr, two survived 3-5 yr, and one has been alive for 5 yr and 5 months. Extirpation is the method of choice in the treatment of primary carcinoma of the gastric stump, while subtotal resection is recommended for primary exophytic carcinoma and for old and weakened patients.

7525 THE RISK FOR GASTRIC CARCINOMA AFTER PARTIAL GASTRECTOMY. (Eng.) Domellof, L.; Janunger, K. G. (Univ. Hosp., S-901 85 Umea, Sweden). *Am. J. Surg.* 134(5):581-584; 1977.

A statistical evaluation of the incidence of gastric stump carcinoma in patients previously operated upon for ulcer disease was undertaken to define a risk group. Systematic endoscopic follow-up of patients operated upon since 1973

revealed 10 such cases. In addition, 188 patients who had undergone Billroth I resection and 488 patients who had undergone Billroth II resection (in 1952-1966) were followed up; 41/188 and 101/488 were unavailable for or refused the study and 39/188 and 159/488 were already dead, 3/159 from stump carcinoma. Gastroscopy of the remaining 108 and 228 patients revealed stump carcinoma in 4 and 7, resp. Of the 14 cases developing stump carcinoma after resection, ulcer disease was known in 10, so that a total of 20 cases (18 men) were analyzed. The risk ratio (observed:expected [O:E] number of stomach carcinoma cases) became <1 at 9-11 yr postoperatively, so that the postoperative periods 0-8 yr, 9-11 yr, and ≥12 yr were used in the analysis, which was corrected for known factors of bias (e.g., sex, age, area of residence); it was possible to combine the 20 cases without introducing bias. The O:E ratio was 0:3.3 at 0-8 yr, 2:2.1 at 9-11 yr, and 12:4.7 at ≥12 yr, the latter ratio being significant (p=0.007 for men, p=0.006 for women); the latter ratio became 12:6.7 and was not significant if the extreme assumption was made that all stump carcinomas are diagnosed 5 yr earlier than if no follow-up was performed. When the estimated annual incidence of stomach carcinoma in operated and nonoperated men 50-85 yr old was calculated, the expected number was higher in the operated patients, with the 50-55 yr age group having an expectation 12 times greater than that of the oldest group. There was a tendency for older patients undergoing operation for gastric ulcer to have a shorter time interval between operation and the development of carcinoma, whereas age at operation for duodenal ulcer seemed not to have any influence on the interval. There was no significant difference in the O:E ratio between gastric (5:2.9) and duodenal (7:4.4) ulcer patients. It is concluded that male patients resected for benign ulcer disease more than 11 yr previously constitute a risk group.

7526 GASTRIC DIVERTICULA FOLLOWING SUBTOTAL GASTRECTOMY. (Eng.) Mihas, A. A.; Han, S. (Div. Gastroenterology, Univ. Alabama, Birmingham, AL 35294). *Gastrointest. Radiol.* 2(3):263-265; 1977.

The cases of four patients in whom gastric diverticula developed in unusual sites following subtotal gastrectomy are presented. The first patient was a 22-yr-old woman with a life-long history of upper gastrointestinal problems. She had previously undergone a posterior gastrojejunostomy for duodenal obstruction, excision of a congenital duodenal diaphragm together with jejunojejunostomy, and a pyloroplasty with a side-to-side duodenojejunostomy for pyloric obstruction. Following the latter operation, she continued having postprandial epigastric pain and vomiting. An upper gastrointestinal series showed prolapse of gastric mucosa into a large duodenum, producing symmetrical defects of the gastroduodenal junction, and a gastric diverticulum. Endoscopy revealed hyperplastic mucosa obstructing the pyloric stoma and a greatly dilated duodenum. A large polypoid mass of gastric mucosa that appeared to be in a position to obstruct intermittently the pylorus and produce a diverticulum of the greater curvature was found at laparotomy. The mass was excised with apparently satisfactory results. The second patient was a 56-yr-old man who had undergone a subtotal gastrectomy with Billroth II anastomosis for peptic ulcer disease 5 yr before developing a gastric diverticulum proximal to the gastrojejunostomy. The third patient was a 58-yr-old man who had undergone a vagotomy and partial gastrectomy with a Billroth II anastomosis for a bleeding duodenal ulcer 17 yr prior to developing almost complete gastric obstruction. Upper gastrointestinal series showed a round mass in both afferent and efferent loops at the anastomosis. At laparotomy, the mass was found to be produced by a prolapsed gastric mucosa that was greatly redundant and hypertrophied. The fourth patient, a 44-yr-old woman, developed a gastric diverticulum simulating an ulcer on the lesser curvature. She had previously undergone subtotal gastrectomy with Billroth II anastomosis followed by further gastric resection with Roux-en-Y anastomosis and vagotomy for duodenal ulcer disease.

7527 MORPHOLOGY OF THE GASTRIC MUCOSA, GASTRIC SECRETION AND SERUM GASTRIN CONCENTRATION FOLLOWING A TEST MEAL. (Eng.) Kaess, H.; Cheli, R.; De Benedetti, F.; Ciancamerla, D.; Dorner, M. (Stadt. Krankenhaus Munchen-Schwabing, Kolnerplatz 1, D-8000 Munich 40, W. Germany). *Digestion* 17(1): 18-28; 1978.

To investigate the gastrin response to a physiological stimulus, the relationship between the histological state of the antral and fundic mucosa, HCl secretion, and serum gastrin response after a test meal of a liquid meat extract was studied in 32 subjects with dyspepsia. In the patients with a normal fundic mucosa (11) or superficial gastritis (3), there was a significant increase in fasting serum gastrin concentration (from 74 ± 4 to 97 ± 5 pg/ml, $p<0.01$) in response to the test meal. In patients with atrophic lesions of the fundic mucosa (18), serum gastrin levels in the fasting state were significantly higher (218 ± 40 pg/ml, $p<0.025$) than in the normal group, and also significantly higher (290 ± 59 pg/ml, $p<0.025$) following the test meal. Fasting and postprandial gastrin concentrations were lower in the 14 patients with antral atrophy than in the 18 with a normal antral mucosa or superficial antral gastritis. The highest levels for basal (324 pg/ml) and postprandial gastrinemia (peak 436 ± 116 pg/ml) occurred in the group of nine patients having a normal antrum associated with atrophic lesions of the fundus. The integrated gastrin response was 4.0 ± 0.8 ng/90 min ($p<0.05$) in the group with atrophic lesions of the fundus and 0.9 ± 0.2 ng/90 min in those with a normal fundus. Patients with atrophic lesions of the antrum had a gastrin response of 1.1 ± 0.3 ng/90 min compared to 3.9 ± 1.1 ng/90 min in the normal antrum group. Basal hypergastrinemia (>100 pg/ml) was seen in 10/14 patients with poststimulating achlorhydria. Gastrin output was not affected by the test meal in patients with atrophic antral lesions, but in those with normal antrum and

atrophic fundus, feeding provoked a significant ($p<0.01$) gastrin response (7.0 ± 1.9 ng/90 min) compared to subjects with normal antrum and fundus (0.9 ± 0.2 ng/90 min). The integrated gastrin output was 0-2.3 pg/90 min in subjects with HCl secretion after maximal stimulation. Elevated gastrin responses (up to 21.2 pg/90 min) were observed in subjects with poststimulatory achlorhydria. There was a significant correlation between basal gastrin concentration and integrated gastrin output in subjects presenting achlorhydria and a normal antrum ($r=0.94$) in contrast to those with achlorhydria and atrophic antral lesions. The results confirm previous investigations on serum gastrin concentration and chronic atrophic gastritis and favor a major role for HCl secretion in gastrin response.

7528 PROTEINLOSING GASTROPATHY WITH GASTRIC HYPERSECRETION OF ACID (H+) AND PEPSIN AND HYPERGASTRINEMIA. A CASE REPORT. (Eng.) Waldum, H. L.; Burhol, P. G.; Nordoe, A.; Kearney, M. (Univ. Hosp., 9012 Tromsoe, Norway). *Acta Hepatogastroenterol.* 24(4):296-301; 1977.

The case of a patient with protein-losing gastropathy, acid and pepsin hypersecretion, and hypergastrinemia is reported. The patient, a 21-yr-old woman, presented with peripheral edema and slight anemia. An upper gastrointestinal series demonstrated gastric folds and two diverticula in the duodenum. Gastroscopy confirmed this appearance, and biopsy revealed changes of chronic superficial gastritis, with atrophy of the superficial glands and infiltration of the lamina propria with nonspecific inflammatory cells. The basal acid and pepsin outputs were 19.1 mEq/hr and 241 mg/hr, resp., and the pentagastrin-stimulated outputs were 39.7 mEq/hr and 485 mg/hr, resp. The fasting serum gastrin level was also elevated, at levels of 216 to 370 pg/ml. The diagnosis of Zollinger-Ellison syndrome was excluded, as the acid secretion and serum gastrin level decreased during the 22-month observation period. In addition, the basal gastric acid concentration (55.1 mEq/l) was lower than usually found in patients with gastrinoma. Acid secretion fell after both secretin and glucagon injection (1.9 and 1.1 mEq/hr, resp.), making the diagnosis of Zollinger-Ellison syndrome even more unlikely. The pepsin output in this patient was even more increased than the acid output, which is contrary to the usual findings in gastrinoma. The giant gastric folds were less prominent at repeat gastroscopy at the end of the observation period.

7529 PRIMARY GASTRIC LYMPHOID PROLIFERATIONS: IMMUNOLOGICAL CRITERIA TO DISTINGUISH GASTRIC LYMPHOMA FROM REACTIVE HYPERPLASIA. (Eng.) Palestro, G.; Poggio, E.; Leonardo, E.; Coda, R. (Istituto di Anatomia e Istologia Patologica, Universita di Torino, Via Santena 7, 10126, Torino, Italy). *Oncology* 34(4):164-167; 1977.

Six patients with a marked gastric lymphoid "hyperplasia," two of these with generalized lymphoma and the others suspected for primary gastric lymphoma, were investigated to discriminate between simple reactive hyperplasias and lymphomatous proliferations. The histological and ultrastructural data confirmed the difficulty of distinguishing reactive lymphoid hyperplasia from malignant lymphoma. In all cases, the presence of inflammatory cells other than mature lymphocytes and of true lymphoid germinal centers did not give an absolutely useful diagnostic criterion. These features, less or more evident, were associated with large and coarsely shaped and irregularly distributed nodules, many of which lacked a recognizable germinal center; moreover, numerous mitoses were noted in the extranodular areas. On histological and clinical grounds, four cases with conspicuous lymphoid hyperplasia and infiltration of the gastric wall were interpreted as primary gastric lymphomas; in the other two, an associated generalized lymphoma was present. In the two patients with generalized lymphoma and gastric involvement and in two of the four with primary striking gastric lymphoid hyperplasia, the number of B lymphocytes was increased in both peripheral blood and in the lymph node suspensions, whereas those in the remaining two patients were within the normal range. On the other hand, E-rosetting and T-cells had lower than normal levels in the same four patients. In the peripheral blood, the percentages of E-rosetting cells and T lymphocytes were 25% and 30%, 40% and 20%, 34% and 30%, and 35% and 25%, resp., in the four patients, whereas the corresponding values in the other two patients were 58% and 65% and 54% and 60%, which were within the normal range. Lymphocyte suspensions from perigastric lymph nodes of one patient with generalized lymphoma and three patients with primary gastric lymphoid hyperplasia were tested. An increased number of B lymphocytes was found in the patient with generalized lymphoma, whereas only the one patient with hyperplasia and increased B lymphocytes in the blood had an increased number of B lymphocytes in the lymphocyte suspension. These data suggest that the primitive exuberant gastric lymphoid hyperplasias may be distinguished in two sets as follows: the first without immunological disorders and the second with peripheral blood signs of immunological alterations.

7530 GASTRIC POLYPOSIS DUE TO MULTIPLE HYPERPLASTIC ADENOMATOUS POLYPS. (Eng.) Weaver, G. A.; Kleinman, M. S. (Dept. Medicine, Mary Imogene Bassett Hosp., Cooperstown, NY 13326). *Am. J. Dig. Dis.* 23(4):346-352; 1978.

Four cases of gastric polyposis (multiple gastric polyps numbering more than 5 in one case and more than 10 in the others) are presented in which the polyps involved diffusely a specific region of the stomach. Presenting symptoms included a lump in the stomach, nausea for approximately 6 months, intermittent upper abdominal pain for 5 yr, and abdominal pain developing after an episode of diarrhea. Results of upper gastrointestinal series showed polypoid antral lesions in cases 1 and 2 and multiple filling defects in case 4; results were normal in case 3. Gastric analysis results were equivocal for gastric acid in case 1, showed no acid

in the fasting state or with betazole stimulation in cases 2 and 4, and showed 2 mEq of acid in a 1-hr basal collection and 27 mEq in a 1-hr betazole stimulated collection in case 3. In cases 1, 2, and 3, endoscopy or gastroscopy revealed multiple polypoid lesions in the antrum. In case 4, most lesions were present on the greater curvature and were located at the junction of the antrum and the body. In all cases, superficial biopsies of the polyps revealed ulcerated gastric mucosa or infiltration of gastric mucosa with inflammatory cells. In cases 2 and 4, several biopsies revealed tissue granulation, and in case 4, there was some cystic dilatation of the gastric glands. These hyperplastic adenomatous polyps frequently appeared as ulcerated elevations of endoscopically normal-appearing gastric mucosa. The polyps ranged in appearance from type I to type III as classified by Yamada. Patients 2, 3, and 4 were taking thiazide diuretics; patients 2 and 4 were taking other drugs as well; Patients 2, 3, and 4 were taking thiazide diuretics; patients 2 and 4 were taking other drugs as well; and patients 2 and 3 consumed alcohol. Patient 4 had pernicious anemia and marked bile reflux. The roles of these factors in the pathogenesis of gastric polyposis require further consideration. The authors conclude that, since carcinoma occurring in these polyps is rare, nonoperative management is probably indicated.

7531 SPONTANEOUS DISAPPEARANCE OF GASTRIC POLYPS: REPORT OF FOUR CASES. (Eng.) Tsukamoto, Y.; Nishitani, H.; Oshiumi, Y.; Okawa, T. (Faculty Medicine, Kyushu Univ., Fukuoka, Japan). *Am. J. Roentgenol.* 129(5):893-897; 1977.

The cases of 4 patients among 88 in whom benign gastric polyps were found are presented to illustrate the rare outcome in which these polyps spontaneously disappeared or regressed. A smooth pedunculated polyp 0.8 cm in diameter that became bilobulated over 22 months and a 3.0 x 1.5-cm polyp that formed during these 22 months in a 55-yr-old woman were followed up at 24 months to reveal that the large polyp had broken off at its base, leaving only a small hemispherical stump. A pedunculated 2.3 x 1.1-cm polyp in a 36-yr-old woman was followed up at 4.5 yr to reveal only a small hemispherical stump 1-cm in diameter, indicating that the polyp had broken off at its base. A pedunculated 3.5 x 1.5-cm polyp was found in a 62-yr-old woman; 2 months later, the polyp surface was eroded, hemorrhagic, and irregular; 23 months later, the polyp had decreased in size to 1.5 x 0.6 cm. A hemispherical polyp 0.8 cm in diameter was found in a 51-yr-old woman; it was unchanged 22 months later; but 4 yr later, the polyp could not be detected, and the gastric mucosa was normal at the polyp's former site.

7532 THE EFFECT OF ANTRECTOMY OR TOTAL GASTRECTOMY ON CALCIUM-INDUCED GASTRIC SECRETION AND GASTRIN RELEASE IN MAN. (Ger.) Schafmayer, A.; Borger, H. W.; Stuhler, T.; Siewert, R.; Becker, H. D. (Klinik und Poliklinik fur Allgemeinchirurgie, Universitat Gottingen, Gosslerstrasse 10, D-3400 Gottingen, W. Germany). *Klin. Wochenschr.* 55(23):1159-1163; 1977.

The effect of antrectomy or of total gastrectomy on calcium-induced gastric secretion and gastrin release was studied by radioimmunoassay in 8 patients who underwent antrectomy and gastroduodenostomy (Billroth I), 12 patients who underwent antrectomy and gastrojejunostomy (Billroth II), 9 patients who underwent total gastrectomy and esophagojejunostomy, and 20 healthy subjects not operated on. The probands received calcium infusion (4 mg/kg/hr for 4.5 hr, i.v.) as calcium gluconate accompanied by a slow i.v. infusion of 4 mg/kg during the first 30 min. The basal serum gastrin level, peak gastrin level, and total gastrin release were reduced in the patients compared with the controls. In the control, calcium stimulated gastric secretion and gastrin release. After antrectomy, gastric secretion was still stimulated by calcium without any change in the serum gastrin levels. After total gastrectomy, the basal serum gastrin concentration was further reduced; calcium did not cause gastrin release. The results show that calcium-induced gastric secretion is due to direct action on the parietal cells and to gastrin release from the antrum.

7533 GASTRIC VARICES: PROBLEM IN DIAGNOSIS. (Eng.) Marshall, J. P., II; Smith, P. D.; Hoyumpa, A. M., Jr. (Veterans Admin. Hosp., Nashville, TN 37203). *Am. J. Dig. Dis.* 22(11): 947-955; 1977.

Three cases that illustrate the characteristics of gastric varices and factors in their diagnosis and management are presented. The first patient was a 39-yr-old alcoholic man with recurrent pancreatitis, abdominal pain, and gastric bleeding. Endoscopy repeatedly demonstrated large gastric "folds" corresponding to a mass seen in a barium study. The findings in both studies were misinterpreted; the correct preoperative diagnosis of splenic vein obstruction and secondary gastric varices was finally established by arteriography and splenoportography. In the second patient, a 75-yr-old alcoholic man with recurrent vomiting, barium studies revealed a mass in the fundus that was thought to be a neoplasm. The correct diagnosis was made on endoscopy and confirmed by arteriography. The third patient was a 42-yr-old alcoholic with a long history of chronic pancreatitis. He presented with a 1-week history of severe abdominal pain. Both radiologic and endoscopic examination suggested a malignancy, and a biopsy was taken during endoscopy. Only normal gastric mucosa was seen, and no bleeding ensued. A celiac angiogram demonstrated almost total occlusion of the splenic vein in the region of the midpancreas with marked collateral filling of the short gastric veins and gastroepiploic veins. The patient's symptoms resolved on conservative management with nasogastric suction, possibly due to

relief of splenic vein obstruction or development of collateral circulation. These cases show the value of arteriography in the diagnosis of gastric varices.

7534 INTRATHORACIC STOMACH. (Eng.) Lewicki, A. M.; Gerson, D. E. (George Washington Univ. Sch. Medicine, Washington, DC). *Appl. Radiol.* 6(6):72-75; 1977.

7535 SPLENIC VEIN THROMBOSIS: AN UNUSUAL CASE OF GASTRIC BLEEDING. (Eng.) Khan, A. H.; O'Reilly, C. J.; Avakian, V. A.; Lucina, P. A. (Mary Hosp., Evergreen Park, IL). *Angiology* 28(10): 725-727; 1977.

7536 GASTRIC ULCER AND FLUORIDE. (Eng.) Waldbott, G. L. (No affiliation given). *Fluoride* 10(4):149-151; 1977.

7537 APPLICATION OF POLISH INSTRUMENTS FOR INTRA-OPERATIVE MEASUREMENTS OF GASTRIC MUCOSA pH. (Pol.) Jedrzejczyk, W.; Tomaszewski, J.; Buczkowski, M.; Peterlejtner, R.; Kruszynski, J.; Filipiak, T.; *et al.* (Z Oddzialu Chirurgicznego Wojewodzkiego Szpitala Zespolonego w Toruniu, ul. Galczynskiego 27 m 24, 87-100 Torun, Poland). *Pol. Tyg. Lek.* 32(38):1457-1459; 1977.

7538 THE HISTORY OF GASTRIC SURGERY. (Spa.) Hidalgo Huerta, M. (No affiliation given). *Rev. Esp. Enferm. Apar. Dig.* 51(6):631-642; 1977.

7539 MACROSCOPIC AND HISTOLOGICAL FINDINGS OF THE RESECTED STOMACH. (Ger.) Potzi, R.; Pesendorfer, F. X.; Denk, H.; Wewalka, F. (I. Medizinische Universitatsklinik, Spitalgasse 23, A-1090 Vienna, Austria). *Z. Gastroenterol.* 15(10):627-629; 1977.

7540 ENDOSCOPIC FINDING: SUTURE MATERIAL IN THE OPERATED STOMACH. (Ger.) Arendt, R.; Hauzeur, F. (Klinik fur Innere Medizin, Wilhelm-Pieck-Universitat, Ernst-Heydemann-Strasse, DDR-25 Rostock, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(4):161-165; 1977.

7541 ENDOSCOPIC FINDINGS IN VAGOTOMIZED PATIENTS. (Ger.) Seiler, P.; Baumgartner, R.; Gassmann, R.; Hefti, M. L.; Leuthold, E.; Stocker, H. (Zurcher Endoskopiegemeinschaft, Zurich, Switzerland). *Z. Gastroenterol.* 15(10):631-632; 1977.

7542 NECROSIS OF THE LESSER CURVATURE OF THE STOMACH AS A COMPLICATION OF SELECTIVE PROXIMAL VAGOTOMY. (Ger.) Lambrecht, W. (Chirurgische Universitatsklinik, Martinistrasse 52, D-2000 Hamburg 20, W. Germany). *Chirurg* 48(11):742-744; 1977.

7543 RESULTS OF REFLUX-FREE GASTRECTOMY WITH PRESERVATION OF DUODENAL DIGESTION. (Rus.) Sukhin, V. S. (Clinic General Surgery, Vladivostok Medical Inst., Vladivostok, USSR). *Khirurgiia (Mosk.)* (10):114-116; 1977.

7544 POSTOPERATIVE OSTEOPLASTIC FIBROPLASIA--A RARE COMPLICATION OF BILLROTH II GASTRIC RESECTION. (Ger.) Eid, M.; Rohde, E. (Bezirkskrankenhaus Rostock-Sudstadt, Otto-Grottewohl-Ring, DDR-25 Rostock, E. Germany). *Zentralbl. Chir.* 103(3):182-184; 1978.

7545 ANASTOMOSIS ULCER AS LATE COMPLICATION OF BILLROTH I AND BILLROTH II GASTRIC RESECTION. (Ger.) Schmid, E.; Adlung, J.; Belohlavek, D.; Blaich, E.; Heinkel, K.; Rosch, W. (Kreiskrankenhaus, Eberhardstrasse, D-7320 Goppingen, W. Germany). *Z. Gastroenterol.* 15(10):626-627; 1977.

7546 BULGING OF GASTRIC FOLDS IN PATIENTS WITH ACROMEGALY. (Ger.) Keto, P.; Korhola, O.; Ihamaki, T. (Universitatsklinik Helsinki, SF-Helsinki, Finland). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(2):233-234; 1978.

7547 BIOCHEMICAL TEST FOR THE PRESENCE OF PEPSINOGEN-PEPSIN FOR THE DIAGNOSIS OF GASTRIC CANCER METASTASES. (Rus.) Kalinovsky, V. P.; Mel'nikov, R. A.; Seits, I. F. (N. N. Petrov Res. Inst. Oncology, Leningrad, USSR). *Vopr. Onkol.* 23(7):18-22; 1977.

7548 FIBROGASTROSCOPY FOR THE DIAGNOSIS OF CANCER OF THE CARDIA. (Rus.) Pavlov, K. A.; Stolyarov, V. I.; Volkov, O. N.; Stefanenko, Iu. F.; Maleret, P. O. (N. N. Petrov Res. Inst. Oncology, Leningrad, USSR). *Vestn. Khir.* 119(7):110-112; 1977.

7549 VALUE OF GASTROSCOPY IN THE EARLY DIAGNOSIS OF GASTRIC CARCINOMA. (Ger.) Weiss, W.; Neumayr, A. (Krankenanstalt Rudolfstiftung der Stadt Wien, Juchgasse 25, A-1030 Vienna, Austria). *Wien. Med. Wochenschr.* 128(2): 37-42; 1978.

7550 CLINICAL ENDOSCOPIC PROBLEMS OF MALIGNANT ALTERATIONS OF THE GASTRIC STUMP. (Ger.) Voigtsberger, P.; Bohm, S.; Vollmar, F.; Pothe, H.; Jager, G. (Medizinische Akademie, Nordhauser Strasse 74, DDR-50 Erfurt, E. Germany). *Z. Gesamte Inn. Med.* 32(9):200-202; 1977.

7551 EXPERIENCE IN THE TREATMENT OF PATIENTS WITH CANCER OF THE GASTRIC STUMP. (Rus.)

Lapin, M. D. (No affiliation given). *Sov. Med.* (8):47-50; 1977.

7552 MALIGNANT NEOPLASMS OF THE STOMACH IN EAST GERMANY. (Ger.) Berndt, H.; Berndt, R.; Gregor, M.; Langer, Th.; Pleissner, I. (Bezirkskrankenhaus, Postfach 480, DDR-20 Neubrandenburg, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(3):123-131; 1977.

7553 ERROR IN THE DIAGNOSIS OF A BENIGN GASTRIC TUMOR. (Rus.) Kravets, B. B.; Krivobokova, P. P. (Municipal Oncological Dispensary, Voronezh, USSR). *Khirurgiia (Mosk.)* (10):104-105; 1977.

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7576 PROPHYLAXIS OF DISTURBANCES IN THE CONTRACTILE FUNCTION OF THE HEART AND OF GASTRIC ULCERATION DURING EMOTIONAL STRESS BY MEANS OF SODIUM OXYBUTYRATE AND VITAMIN E. (Rus.) Meerson, F. Z.; Giber, L. M.; Markovskaia, G. I.; Radzievskii, S. A.; Rozhitskaia, I. I.; Kogan, A. Kh. (Inst. General Pathology and Physiology, Acad. Medical Sciences, Moscow, USSR). *Dokl. Akad. Nauk SSSR* 237(5):1230-1233; 1977.

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7584 A CASE OF TOTAL MICROPOLYPOSIS OF THE STOMACH AND PROXIMAL SEGMENTS OF THE DUODENUM IN A 14-YEAR-OLD GIRL. (Rus.) Shcherbakova, L. P. (Municipal Hosp., Kirovo-Chepetsk, USSR). *Vopr. Okhr. Materin. Det.* 22(8):87-88; 1977.

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See also, 7326, 7352, 7366, 7378, 7473, 7474, 7481, 7487, 7499, 7502, 7503, 7504, 7507, 7508, 7511, 7513, 7515, 7516, 7598, 7601, 7602, 7603, 7606, 7608, 7611, 7613, 7615, 7616, 7617, 7618, 7620, 7621, 7622, 7911, 7920, 7933, 7934, 7935, 7936.

7587 THE GIANT DUODENAL ULCER SYNDROME. (Eng.) Segal, I.; Solomon, A.; Ou Tim, L.; Lawson, H. H.; Sottomayor, M. C. C. G. (Baragwanath Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 52(18):724-727; 1977.

The cases of 13 patients with giant duodenal ulcer (GDU) are reviewed with respect to clinical, radiological, endoscopic, and pathological features, and the differential diagnosis and treatment of this entity are briefly discussed. The symptoms were characterized by a chronic history of exacerbations and remissions. Pain was often situated in the right hypochondrium, always radiated to the back, and was aggravated by food and antacids. Vomiting, weight loss (all cases), hematemesis or melena due to gastrointestinal tract bleeding (all cases), pallor, and mild upper abdominal tenderness (especially in the epigastrium) were also observed. The ulcer may be so large that the crater may mimic a normal duodenal bulb in radiological examinations; other radiological signs may include a patulous or destroyed pylorus, a crater of constant size and shape without contractions, an absent mucosal pattern over the crater and constriction distal to the crater, single or multiple filling defects in the base of the ulcer, compression of the third portion of the duodenum by the mesentery due to the inflammatory process, a persistent and unchanging round collection of air in the crater, and retention of contrast material in the ulcer for several hours after examination. Endoscopy reveals a widened, edematous, hyperemic pyloric sphincter; the ulcer is clearly seen as a soft necrotic trough extending circumferentially around the whole mucosa, virtually replacing the duodenal wall. Pathologically, the crater often replaces the duodenal bulb and erodes into the head of the pancreas, forming a walled-off perforation; distortion of the gastric antrum by the inflammatory process extends into the mesenteric root causing compression of the third portion of the duodenum; and adherence to surrounding structure is common. Histology confirms the benign nature of the lesion. The history and presentation of GDU are confusing and protean, complicating the diagnosis. Radiology differentiates GDU clearly from posterior penetrating ulcer. Treatment is very important because the incidence of serious complications and the mortality rate (40-67% in previously reported series) are quite high. Of the 13 patients in this series, 1 died, 9 underwent surgery, and 3 were treated medically (of whom 1 improved and 2 later required surgery).

7588 SERUM GASTRIC INHIBITORY POLYPEPTIDE (GIP) IN DUODENAL ULCER DISEASE: RELATIONSHIP TO GLUCOSE TOLERANCE, INSULIN, AND GASTRIN RELEASE. (Eng.) Arnold, R.; Creutzfeldt, W.; Ebert, R.; Becker, H. D.; Borger, H. W.; Schafmayer, A. (Medizinische Univ.-Klinik, Humboldtallee 1, D-3400 Gottingen, W. Germany). *Scand. J. Gastroenterol.* 13(1):41-47; 1978.

Basal and food-stimulated serum immunoreactive gastric inhibitory polypeptide (IR-GIP), gastrin (IRG), and insulin (IRI) levels were estimated in 41 normal weight patients with chronic duodenal ulcer disease and 25 weight- and age-matched controls to determine whether gastric acid hypersecretion in duodenal ulcer disease is related to a faulty GIP secretion. A pathological glucose tolerance (a 60-plus 120-min sum of blood glucose levels >310 mg/dl) was observed in 15/41 patients during standard oral glucose tolerance tests with 75 g of glucose and in 28/41 patients after ingestion of a high-calorie test meal (1,031 calories ingested within 10 min). The test meal induced a rapid rise of IR-GIP, IRI, glucose, and IRG in duodenal ulcer patients and controls for 5 hr, but all four parameters increased to significantly higher ($p<0.02$) levels in the patients; serum IR-GIP increased most markedly in patients with a pathological glucose tolerance response during the test meal and remained significantly elevated for 5 hr. The GIP response of patients with a normal glucose tolerance response to the test meal was less marked and only higher than the controls for 2 hr. The duodenal ulcer patients had significantly greater integrated IR-GIP, IRI, and glucose responses than did the controls (IR-GIP: 266.4 ± 27.3 and 108.1 ± 10.9 ng/ml/180 min, resp.; IRI: 10.4 ± 1.3 and 4.9 ± 0.6 mU/ml/180 min, resp.; glucose: 13.9 ± 1.3 and 4.7 ± 0.7 g/100 ml/180 min, resp., $p<0.02$ in all cases). These responses were significantly greater in patients with pathological than in those with normal glucose responses (IR-GIP: 302.8 ± 18.4 and 196.2 ± 12.8 ng/ml/180 min, resp., $p<0.005$; IRI: 13.4 ± 0.6 and 7.2 ± 0.3 mU/ml/180 min, resp., $p<0.02$; glucose: 18.5 ± 0.5 and 8.7 ± 0.3 g/100 ml/180 min, resp., $p<0.02$). The results rule out the possibility that hyposecretion of GIP is a factor in the pathogenesis of gastric acid hypersecretion in duodenal ulcer patients.

7589 GASTRIC MUCOSAL HISTAMINE IN DUODENAL-ULCER PATIENTS: RELEASE BY SECRETIN. (Eng.) Domschke, W.; Subramanian, N.; Mitznegg, P.; Baenkler, H. W.; Domschke, S.; Wunsch, E. (Dept. Medicine, Univ. Erlangen-Nurnberg, Krankenhausstr. 12, D-8520 Erlangen, W. Germany). *Acta Hepato-gastroenterol. (Stuttg.)* 24(6):444-446; 1977.

Since many duodenal ulcer patients manifest a local anaphylactic skin reaction to intradermal secretin, studies were carried out to determine whether secretin-induced histamine release also occurs in the gastrointestinal tract of duodenal ulcer patients. Biopsy samples from the fundus of five duodenal ulcer patients with an anaphylactic skin reaction to intradermal secretin and of four healthy controls were superfused with phosphate buffer alone or with buffer containing synthetic secretin

(20 Clinical U/ml). Mucosal specimens from the duodenal ulcer patients released histamine in response to secretin, reaching a 65% increase above the basal level ($p<0.05$), whereas specimens from the controls showed no change in response to the infusion. The histamine content of untreated gastric mucosa was about twice as high as that in controls ($p<0.02$). The elevated mucosal histamine could account for the basal and stimulated gastric hypersecretion seen in duodenal ulcer patients. Additionally, the results are compatible with the concept that, in a certain type of duodenal ulceration, secretin stimulates rather than inhibits gastric secretion.

7590 THE EFFECT OF ORAL LOCAL ANAESTHETIC AND ALKALI ON BASAL AND FOOD-STIMULATED SERUM GASTRIN LEVELS IN PATIENTS WITH DUODENAL ULCER. (Eng.) Barbezat, G. O.; Vinik, A. I.; Grant, B. (Groote Schuur Hosp., Observatory, 7925, Cape, South Africa). *Scand. J. Gastroenterol.* 13(3):321-323; 1978.

The effect of p.o. therapeutic doses of alkali (aluminum hydroxide, 1.2 g plus magnesium hydroxide, 0.4 g), local anesthetic (oxethazaine, 40 mg), a combination of alkali and anesthetic, or water (20 ml) as control on basal and food-stimulated serum gastrin levels was investigated in 12 asymptomatic patients with duodenal ulcer. The basal serum gastrin levels were all within normal limits. Treatment with any of the three agents did not significantly alter these concentrations. The ingestion of meat extract was associated with a mean rise in serum gastrin levels in all treatment groups. Fifteen minutes after the meal, patients pretreated with oxethazaine had significantly lower serum gastrin levels than did those who received water ($p<0.05$), alkali and oxethazaine ($p<0.01$), or alkali alone ($p<0.001$). There was no significant difference among the water, alkali plus oxethazaine, or alkali treated groups. After a further 15 min, only the alkali and the oxethazaine groups showed any significant difference from controls ($p<0.05$). This study confirms that noncalcium-containing alkalis, whether given alone or with a local anesthetic, do not alter basal serum gastrin levels in man.

7591 DOUBLE-BLIND CONTROLLED TRIAL OF AMYLOPECTIN SULPHATE (DEPEPSEN) IN THE SYMPTOMATIC TREATMENT OF DUODENAL ULCER. (Eng.) Baron, J. H.; Gribble, R. J. N.; Holdstock, D. J.; Misiewicz, J. J. (Hammersmith Hosp., London W12 OHS, England). *Gut* 18(9):723-724; 1977.

A double-blind controlled trial of amylopectin sulfate (Depepsen) in the treatment of duodenal ulcer was carried out in male patients with radiological evidence of duodenal ulcer crater or deformity in the previous 2 yr, a 6-month to 5-yr history of duodenal ulcer symptoms, and ulcer pain on at least 3 of 7 days prior to admission to the trial. The patients received their customary antacids and either amylopectin sulfate (500 mg, tablet, 20 patients) or identically appearing placebo (500 mg dextrose, 21 patients) to be chewed and swallowed with a drink every 2 hr for six doses/day. The patients kept diary cards recording the presence, absence, and severity (0, 1, or 2) of pain and the number of test and antacid tablets consumed each day, which were collected every 2 weeks for 6 weeks. Duodenoscopy was not available when the study was undertaken. Diary cards were satisfactorily completed by 12/20 and 16/21 patients in the two groups, resp. Depepsen had no advantage over placebo with respect to mean number of days and nights with ulcer pain/patient, mean number of antacid tablets consumed/patient/week, or the severity of pain.

7592 VARIATIONS IN SERUM PROLACTIN FOLLOWING CIMETIDINE TREATMENT FOR PEPTIC ULCER DISEASE. (Eng.) Delle Fave, G. F.; Tamburrano, G.; De Magistris, L.; Natoli, C.; Santoro, M. L.; Carratu, R.; *et al.* (Cattedra di Gastroenterologia, II Clinica Medica, Policlinico Umberto I, 00100 Roma, Italy). *Rend. Gastroenterol.* 9(2):142-143; 1977.

Variations in serum prolactin levels were studied in 10 patients before and after cimetidine treatment for peptic ulcer disease. The first group of patients (5 men and 2 women, aged 27-60 yr) received 1.6 g of cimetidine daily, p.o., for duodenal ulcer (2 cases), recurrent postgastrectomy ulcer (3 cases), or Zollinger-Ellison syndrome. The second group (3 men, aged 35-65 yr) received 1.0 g of cimetidine daily for duodenal ulcer. The drug was given in four daily doses for 8 weeks. The pretreatment prolactin levels were within normal limits in all patients. In the patients who received the higher dose of cimetidine, these values showed a constant increase over the 8-week treatment period, reaching 12.5-32 ng/ml (mean, 20.3 ± 2.9, $p<0.001$). These values returned to normal 3 to 4 weeks after the treatment was discontinued. There was no significant change in the prolactin levels in patients who received the lower dose of cimetidine. Gynecomastia and galactorrhea were observed respectively in two of the seven patients who received the higher dose and in none of the patients who received the lower dose. These observations show that the effect of cimetidine on prolactin levels is probably dose-dependent. The mechanism responsible remains to be elucidated.

7593 THE USE OF GLIPTIDE IN PATIENTS WITH DUODENAL ULCERS. (Eng.) Gilmore, A. M.; McCarthy, C. F.; Feighery, C.; Weir, D. G.; O'Neill, M.; Whelton, M.; *et al.* (Regional Hosp., Galway, Ireland). *Ir. Med. J.* 70(20):615-617; 1977.

A double-blind study of the value of Gliptide (a sulfaglycopeptide, 50 mg [2 tablets] t.i.d.) in the treatment of duodenal ulcers was carried out in 76 patients, 39 of whom received this drug and 37 of whom received placebo. Significantly more ulcers healed in the Gliptide group than in the placebo group ($p<0.02$) during the 8 weeks of observation. Gliptide treatment was also significantly better than

placebo in the treatment of ulcers in patients in whom some deformity of the duodenal cap was present ($p < 0.01$). Although this treatment was superior to placebo, only 50% of ulcers had healed at 8 weeks.

7594 METHYL-PROSTAGLANDIN E_2 ANALOGUES FOR HEALING OF GASTRODUODENAL ULCERS. (Eng.) Rybicka, J.; Gibinski, K. (Silesian Sch. Medicine, Katowice, Poland). *Scand. J. Gastroenterol.* 13(2): 155-159; 1978.

A double-blind clinical trial of the value of methyl-prostaglandin E_2 ($mPGE_2$) analogues in the treatment of ulcers was carried out in 117 men with gastroduodenal ulcers. Thirty-six patients received placebo, 25 received 15(R) 15-$mPGE_2$ methyl ester ($mPGE_2$ R, 2.0 µg/kg, t.i.d.), 36 received 15(S) 15-$mPGE_2$ methyl ester ($mPGE_2$ S, 1.5 µg/kg, 3-4 times/day), and 20 received 16,16-dimethyl PGE_2 (di $mPGE_2$, 1.5 µg/kg, 3-4 times/day). Prostaglandin treatment resulted in significant decreases in both basal acid output ($p<0.05$, $p<0.001$, $p<0.001$, and $p<0.001$ for $mPGE_2$ R, $mPGE_2$ S, di $mPGE_2$, and pooled analogues, resp.) and mean acid output ($p<0.01$, $p<0.001$, $p<0.001$, and $p<0.001$, resp.) in comparison with the levels in controls. The number of duodenal ulcers that cicatricized was significantly higher ($p<0.01$) in the PGE_2-treated patients than that in controls, and this was especially true in patients treated with $mPGE_2$ S ($p<0.001$, in comparison with controls). This healing was not seen in gastric ulcers.

7595 TREATMENT OF PEPTIC ULCER IN ZOLLINGER-ELLISON SYNDROME WITH HISTAMINE H_2 RECEPTOR ANTAGONISTS. (Ger.) Hausamen, T. U.; Fritsch, W. P.; Scholten, T.; Jungblut, R.; Strohmeyer, G. (Stadtische Kliniken, Beurhausstr. 40, 4600 Dortmund, W. Germany). *Dtsch. Med. Wochenschr.* 102(47):1709-1712; 1977.

Four patients with recurrent peptic ulcer due to Zollinger-Ellison syndrome were treated with the histamine H_2-receptor antagonists cimetidine and metiamide. All patients were treated with cimetidine (5 x 200 mg/day) for 1.5-4.5 months. One patient was at first treated with metiamide in the same dosage, and another received methantheline bromide (50 mg) in addition to metiamide. The ulcerations were completely healed in all patients. Two patients developed recurrent ulcers after the treatment was stopped, but responded to a second course. One patient developed acute hepatitis B following the cimetidine treatment; the course of the hepatitis may have been unfavorably affected by cimetidine. No other side-effects were noted, nor was there any significant change in the basal serum gastrin concentration or an increase in the H^+ secretion. While total gastrectomy remains the treatment of choice in Zollinger-Ellison syndrome, cimetidine treatment should be considered if the patient refuses operation or if surgery is not feasible in view of the poor general condition of the patient.

7596 FEVER, ABDOMINAL PAIN, AND LEUCOPENIA DURING TREATMENT WITH CIMETIDINE. (Eng.) Corbett, C. L.; Holdsworth, C. D. (Royal Infirmary, Sheffield S6 3DA, England). *Br. Med. J.* 1(6115): 753-754; 1978.

7597 THE USE OF CIMETIDINE IN SEVERE DUODENAL ULCERATION. (Eng.) Gray, G.; Smith, I. S.; Mackenzie, I.; Gillespie, G. (Victoria Infirmary, Glasgow, Scotland). *Scott. Med. J.* 22(4):293-294; 1977.

7598 PREVALENCE OF PEPTIC ULCER AND ITS COMPLICATIONS. (Eng.) MacKay, C. (Western Infirmary, Glasgow, Scotland). *Scott. Med. J.* 22(4):288-289; 1977.

7599 MORPHOFUNCTIONAL CHANGES OF THE PANCREAS IN ULCER DISEASE. (Rus.) Teply, B. K. (Dept. Clinical Surgery, Kiev Medical Inst., Kiev, USSR). *Vrach. Delo* (12):24-30; 1977.

7600 TOBACCO SMOKING AND GASTRODUODENAL ULCERS. (Rus.) Vainshtein, S. G. (V. I. Lenin Kazan Inst. Advanced Training Physicians, Kazan, USSR). *Klin. Med. (Mosk.)* 56(3):11-18; 1978.

7601 DIAGNOSIS, MANAGEMENT, AND OUTCOME OF UPPER GASTROINTESTINAL HEMORRHAGE IN CHILDREN AND ADOLESCENTS [Abstract]. (Eng.) Cox, K. L.; Ament, M. E. (Dept. Pediatrics, Univ. California, Los Angeles, CA). *Clin. Res.* 26(2):173A; 1978.

7602 ANTRAL AND DUODENAL GASTRIN CELL MASS IN GASTRECTOMY SPECIMENS FROM PATIENTS WITH PEPTIC ULCER [Abstract]. (Eng.) Keuppens, F.; Willems, G. (Gastro-Enterological Res. Unit, Vrije Universiteit Brussels, Brussels, Belgium). *Digestion* 16(1/2):212-213; 1977.

7603 SECRETIN-INDUCED LIBERATION OF GASTRIN AND NON-GASTRIN SECRETAGOGUE IN THE ZOLLINGER-ELLISON SYNDROME AND IN DUODENAL ULCER [Abstract]. (Eng.) Girodet, J.; Hervour, P.; Accary, J. P.; Mignon, M.; Dubrasquet, M.; Bonfils, S. (INSERM, U 10, Hopital Bichat, 75877 Paris Cedex 18, France). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):490-491; 1977.

7604 SERUM GASTRIN RESPONSE TO INSULIN AT HIGH INTRAGASTRIC pH BEFORE AND AFTER SELECTIVE VAGOTOMY FOR DUODENAL ULCER [Abstract]. (Eng.) Emas, S.; Dorner, M.; Kaess, H.; Lilja, B.; Svensson, S. O. (Karolinska Hosp., Stockholm, Sweden). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):482-483; 1977.

7605 CLINICAL AND SECRETORY CORRELATIONS OF VERY LONG-TERM TREATMENT WITH CIMETIDINE [Abstract]. (Eng.) Saunders, J. H. B.; Cargill, J. M.; Wormsley, K. G. (Ninewells Hosp., Dundee, Scotland). *Acta Hepatogastroenterol. (Stuttg.)* 24(6):485; 1977.

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7609 CIMETIDINE: A REVIEW OF ITS PHARMACOLOGICAL PROPERTIES AND THERAPEUTIC EFFICACY IN PEPTIC ULCER DISEASE. (Eng.) Brogden, R. N.; Heel, R. C.; Speight, T. M.; Avery, G. S. (Australasian Drug Information Services, P.O. Box 34-030, Birkenhead, Auckland 10, New Zealand). *Drugs* 15(2):93-131; 1978.

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7611 INHIBITION OF BASAL AND PENTAGASTRIN-STIMULATED GASTRIC ACID SECRETION AFTER TREATMENT WITH BENZILONIUM BROMIDE AND AFTER SELECTIVE PROXIMAL VAGOTOMY. (Eng.) Jaska, F. (Koping Hosp., S-731 01 Koping, Sweden). *Scand. J. Gastroenterol.* 12(6):695-699; 1977.

7612 CURRENT OPERATIONS FOR DUODENAL ULCER. (Eng.) Nyhus, L. M. (Univ. Illinois, Medical Center, Chicago, IL 60680). *Jpn. J. Surg.* 7(3):105-113; 1977.

7613 THERAPEUTIC USES OF CIMETIDINE. (Eng.) Thomson, T. J. (Stobhill General Hosp., Glasgow, Scotland). *Scott. Med. J.* 22(4):300-305; 1977.

7614 SYSTEMATIC FOLLOW-UP: A CONCEPT FOR EVALUATION OF OPERATIVE RESULTS IN DUODENAL ULCER PATIENTS. (Eng.) Rohde, H.; Troidl, H.; Lorenz, W. (Chirurgische Universitatsklinik, Robert-Koch-Str. 8, D-3550 Marburg/Lahn, W. Germany). *Klin. Wochenschr.* 55(19):925-932; 1977.

7615 EROSIVE GASTRITIS AND DUODENITIS DURING CONTINUOUS CIMETIDINE TREATMENT. (Eng.) Webster, J.; Petrie, J. C.; Mowat, N. A. G. (Dept. Therapeutics, Univ. Aberdeen, Aberdeen AB9 2ZD, Scotland). *Br. Med. J.* 1(6104):20-21; 1978.

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7617 THE ESOPHAGUS IN PATIENTS WITH GASTRODUODENITIS AND PEPTIC ULCER DISEASE. (Eng.) DeLuca, V. A., Jr.; Sheahan, G. D. (Griffin Hosp., Derby, CN 06418). *South. Med. J.* 71(Suppl. 1):52; 1978.

7618 POSTOPERATIVE RECURRENT PEPTIC ULCER: THE SIGNIFICANCE OF THE ZOLLINGER-ELLISON SYNDROME. (Eng.) Lusby, R. J.; Byrnes, D. J.; Hugh, T. B. (St. Vincent's Medical Center, 376 Victoria St., Darlinghurst, New South Wales 2010, Australia). *Med. J. Aust.* 2(12):389-391; 1977.

7619 SELECTIVE VAGOTOMY FOR DUODENAL ULCER: A FIVE-YEAR FOLLOW-UP. (Eng.) Coupland, G. A. E.; Cumberland, V. H.; Lorang, M. E. (Royal North Shore Hosp. Sydney, St. Leonards, New South Wales 2065, Australia). *Med. J. Aust.* 2(12): 386-388; 1977.

7620 ROLE OF ISCHAEMIA IN THE INITIATION OF PEPTIC ULCER. (Eng.) Piasecki, C. (Royal Free Hosp. Sch. Medicine, London, England). *Ann. R. Coll. Surg. Engl.* 59(6):476-478; 1977.

See also, 7352, 7378, 7506, 7524, 7525, 7541, 7565, 7567, 7573, 7575, 7631, 7911, 7920, 7933.

7621 ENTEROKINASE ACTIVITY IN HUMAN INTESTINALIZED GASTRIC MUCOSA. (Eng.) Simon, L.; Figus, A. I. (Hospital Jaszbereny, H-5101 Jaszbereny, Hungary). *Digestion* 16(1/2):48-50; 1977.

Enterokinase activity was examined in six homogenized specimens of human gastric tissue with intestinal metaplasia, three specimens of normal gastric mucosa, and three specimens of normal duodenal mucosa. Enterokinase activity was demonstrated in normal duodenal mucosa at a level of 34.3 ± 8.2 U/g mucosa, while no activity was found in the normal gastric mucosa. Enterokinase activity was demonstrated in the homogenate of intestinalized gastric mucosa (5.41 ± 2.11 U/g), and the level was increased in homogenates of biopsy specimens taken 10 min after the subjects had received an i.v. injection of 1 mg of glucagon (8.28 ± 3.75 U/g, $p<0.01$). These observations support the hypothesis that intestinalized brush border cells of gastric mucosa may have the original absorptive and secretory capacity of true intestinal epithelium.

7622 ABNORMAL DUODENAL LOOP AND PYLORIC REGURGITATION. (Eng.) Thommesen, P. (Municipal Hosp., Aarhus, Denmark). *Acta Radiol. [Diagn.] (Stock.)* 18(4):473-479; 1977.

Studies were carried out in 48 patients with upper abdominal dyspepsia to investigate whether duodenal anomalies and posture have any influence on pyloric regurgitation and whether a parasympathetic drug (metochlopramide) has any effect on the regurgitation. Eleven patients had a normal duodenal loop, 14 had a proximal duodenal anomaly and passage hindrance high in the duodenum, and 23 had a distal anomaly or a short duodenal loop or combined anomaly. A tube was passed into the descending part of the duodenum, and 20 ml of contrast medium was instilled. Fluoroscopy and exposure of the films were carried out immediately and after 4 min. Pyloric regurgitation occurred significantly more often in the 23 patients with a distal anomaly, short duodenal loop, or combined anomaly (19/23; χ^2=12.4, 3.84 at 5% level) than in the first group (2/11). No evident difference was demonstrated between the first and second groups; 5 of the 14 patients in the second group had regurgitation (χ^2=1.20, 3.84 at 5% level). Regurgitation occurred in 11 of 17 patients in an erect position but in none of these patients when they were supine. Regurgitation in the erect position was more effectively prevented by metochlopramide (20 mg, i.v.) than by placebo (7/12 and 2/12, resp.; χ^2=4.61, 3.84 at 5% level). The results suggest that a relation exists between pyloric regurgitation, the shape of the duodenal loop, and the position of the patient, and that metochlopramide has an effect on the regurgitation. Distal and combined anomalies and a short duodenal loop predispose the patient to pyloric regurgitation.

7623 JEJUNAL DIVERTICULITIS. (Eng.) Giustra, P. E.; Killoran, P. J.; Root, J. A.; Ward, W. W. (Penobscot Bay Medical Center, Rockland, ME 04841). *Radiology* 125(3):609-611; 1977.

The cases of two patients with jejunal diverticulitis are presented. Both patients exhibited episodes of partial small bowel obstruction, acute abdominal symptoms, abdominal masses, intermittent hypochromic anemia, and recurrent diverticulitis over several years. The first patient was a 50-yr-old man in whom jejunal diverticulitis was suggested on the basis of low-grade jejunal obstruction. He responded to medical treatment, but 4.5 yr later he developed signs of generalized peritoneal irritation. Abdominal radiographs showed dilated, fluid-filled loops of small intestine thought to be consistent with adynamic ileus caused by peritonitis. The clinical diagnosis was sigmoid diverticulitis, and the patient responded to antibiotic therapy and i.v. fluids. A subsequent barium enema study was negative for sigmoid diverticulitis, and a small bowel series demonstrated extravasation of barium from a ruptured jejunal diverticulum into a sealed-off mesenteric abscess. The other patient was a 79-yr-old woman with left upper quadrant abdominal pain and a firm, nontender, movable anterior left subcostal abdominal mass. A barium enema study showed a persistent localized contour abnormality of the inferior aspect of the distal transverse colon. An upper gastrointestinal series demonstrated jejunal diverticula, but they were not readily associated with the abnormal barium study. At surgery, a 1.5-cm jejunal diverticulum was found together with an inflammatory mass. The mass adhered to the colon, although the latter was not directly involved with the abscess. The mass and two adjacent jejunal loops were resected. There were also other small adjacent jejunal diverticula. Six years later, multiple diverticula of the jejunum with secondary diverticulitis and abscess formation were found at surgery. A 4-cm pus-filled abscess space forming an adhesive S-shaped mass binding segments of the jejunum together was demonstrated. In the event of future nonspecific acute or chronic abdominal findings, previous knowledge of jejunal diverticula might suggest a diagnosis of jejunal diverticulitis and lead to barium studies sooner than would otherwise be the case.

7624 INTRAMURAL HEMORRHAGE OF THE SMALL INTESTINE. (Eng.) Eiland, M.; Han, S. Y.; Hicks, G. M., Jr. (Radiology Associates, 1717 11th Ave., S., Birmingham, AL 35205). *JAMA* 239(2):139-142; 1978.

The roentgenographic features, course, and treatment of intramural hemorrhage are discussed, and seven illustrative cases are presented. The patients included two on anticoagulation therapy and four hemophiliacs. The hemorrhage produced one of two sets of manifestations: those related to a localized intramural mass and those related to diffuse infiltration of the bowel wall. Preliminary films of the abdomen in patients with hematoma showed a mass density with displacement of adjacent bowel. Adynamic ileus was frequently seen, and in the affected

areas that contained gas, narrowing of the lumen and scalloping or thumbprinting were seen. Barium studies usually showed segmental changes, and the affected bowel was rigid. The bowel loops were separated, and the lumen was narrow but not obstructed. There was uniform thickening of the folds, which were sharply demarcated. Their parallel arrangement gave a spike-like ("coil spring") appearance. This was most frequently seen in the jejunum, where valvulae were rarely effaced. Thumbprinting was frequently well demonstrated with barium studies. Transient intussusception was present in two patients. In two patients with no discrete intramural mass, thumbprinting and the coil spring appearance were present. All but one of the patients had resolution of signs and symptoms with conservative therapy.

7625 EOSINOPHILIC GASTROENTERITIS PRESENTING AS ILEOCOLITIS. (Eng.) Haberkern, C. M.; Christie, D. L.; Haas, J. E. (Children's Orthopedic Hosp. and Medical Center, Seattle, WA 98101). *Gastroenterology* 74(5, Part 1):896-899; 1978.

The case of a patient with clinical and roentgenographic ileocolitis diagnosed as Crohn's disease who was subsequently found to have eosinophilic gastroenteritis with colonic involvement is presented. The patient was a 15-yr-old girl with nausea, vomiting, abdominal pain, diarrhea, and weight loss. The peripheral eosinophil count was 600/mm^3. Barium enema showed marked mucosal edema and thickening of the terminal ileum, cecum, and ascending and proximal transverse colon. The upper gastrointestinal series with small bowel follow-through revealed a normal stomach and bowel to the terminal ileum, which itself appeared abnormal with fixation and mucosal thickening. Colonoscopy showed an erythematous cecum, and biopsy showed a normal colonic epithelium. The patient responded to prednisone therapy, which was given for a presumptive diagnosis of Crohn's ileocolitis, but diarrhea persisted. Prednisone therapy was tapered 1 month after hospitalization, at which time a repeat upper gastrointestinal series showed a normal terminal ileum. After discontinuing therapy, the patient again developed abdominal complaints together with urinary tract symptoms. The peripheral eosinophil count was 400/mm^3. The upper gastrointestinal series showed prominent gastric antral folds along with bowel wall thickening from the duodenum through the ileum. At laparotomy, the ascitic fluid was found to be rich in eosinophils, and multiple full thickness biopsies revealed the following: diffuse eosinophilic infiltration of the muscularis and serosa of the stomach, duodenum, jejunum, ileum, and right colon; eosinophilic infiltration of the fibrous stroma separating bladder-wall muscle bundles; and eosinophilic infiltration of a mesenteric lymph node. The patient's symptoms responded to prednisone, hydralazine, nitrofurantoin, and antacid therapy for eosinophilic gastroenterocolitis, cystitis, and a duodenal ulcer.

7626 ACUTE FULMINATING TRANSMURAL ILEOCOLITIS AFTER SMALL BOWEL BYPASS FOR MORBID OBESITY. (Eng.) Francis, W. W.; Iannuccilli, E. (110 Lockwood St., Providence, RI 02903). *Am. J. Surg.* 135(4):524-528; 1978.

Thirty-one patients who underwent small intestinal bypass for morbid obesity were followed up. Each patient underwent an end-to-end jejuno-ileostomy anastomosing 14 inches of proximal jejunum to 4 inches of terminal ileum. Complications included hepatic insufficiency (3 patients), urinary calculi (4), inadequate weight loss (6), metabolic acidosis (3), and severe diarrhea (5). The most unusual complication occurred in a 39-yr-old woman, whose case report is presented. She developed profuse diarrhea, abdominal cramps, fever, and a weight loss of 12 pounds in 1 week at 22 months post-bypass. Before this time, she had apparently responded well to the operation, losing 132 pounds during the 22-month period. Microscopic examination of a resected segment of previously bypassed and diseased small bowel revealed findings consistent with Crohn's disease. Normal bowel continuity was re-established and the diseased small bowel was resected. The patient recovered, and weighs 195 pounds following surgery and steroid therapy.

7627 CHANGES IN PLASMA AND MUSCLE FREE AMINO ACIDS IN OBESE PATIENTS AFTER JEJUNO-ILEAL BYPASS. (Eng.) Goldberger, J. H.; Cha, C. J.; Randall, H. T. (Rhode Island Hosp., Providence, RI). *Surg. Forum* 28:432-435; 1977.

The nutritional state of six obese patients who underwent jejunoileal bypass was assessed by analyzing changes in plasma and muscle cell free amino acids. The preoperative plasma amino acid profiles were normal in all patients. Three months postoperatively, all essential amino acids, except methionine, and most of the nonessential amino acids in the plasma were decreased. The decreases were statistically significant in the case of valine ($p<0.05$), lysine ($p<0.05$), and cystine ($p<0.05$). Only glycine (22.7%) and, occasionally, serine increased. Intracellular free leucine, valine, and isoleucine significantly decreased postoperatively (by 49.4%, 41.2%, and 32.8%, resp., $p<0.05$). Anserine also decreased (by 34.0%), with a suggestive significance ($p<0.1$). The concentrations of serine, glycine, ornithine, histidine, methionine, taurine, threonine, and proline increased postoperatively (by 57.0%, 37.8%, 33.9%, 31.4%, 10.4%, 24.3%, 21.0%, and 14.7%, resp.), but statistical significance could not be demonstrated in this small series. These data suggest that there are significant differences in the change in concentrations of free amino acids between plasma and muscle in obese patients who have undergone a bypass procedure, and that changes in plasma amino acid composition is not necessarily relevant to muscle and probably not to the total amino acid pool.

7628 TRAUMATIC RETROPERITONEAL RUPTURE OF THE DUODENUM. (Eng.) Vellar, D. J.; Vellar, I. D. A.; Pianta, R. M. (Essex County Hosp., England). *Aust. N.Z. J. Surg.* 46(3):206-208; 1976.

The cases of six patients with traumatic retroperitoneal duodenal rupture are presented. The injury was associated with a car accident in three cases, with being struck by an automobile in one case, and with being struck in the abdomen in two cases. Abdominal examination revealed tenderness, guarding, and rigidity, and these signs were maximal in the lower abdomen rather than in the upper abdomen in three patients. Only one patient had any abnormality in the plain x-ray film of the abdomen; in this case, the right psoas shadow was obliterated, which suggested the possibility of duodenal rupture. Four patients showed sufficient abnormalities on repeated abdominal examination to lead to laparotomy within 12 hr of injury. There was a 66-hr delay in surgery in one patient because of severe skeletal injuries. This patient, and the four in whom surgery was carried out within 12 hr, survived with surgical treatment. The remaining patient showed indefinite signs on abdominal palpation, but 20 hr after the injury, florid generalized peritonitis had set in, with accompanying generalized rigidity, guarding, and tenderness. At operation, an i.v. pyelogram showed obvious gas in the retroperitoneal tissues. After the operation, the patient became hypotensive and anuric. He had gross hemolysis, and many encapsulated *Clostridium perfringens* were discovered in the peritoneal fluid. He died 20 hr after surgery. These cases illustrate the need for early diagnosis and treatment of this rare type of abdominal trauma, and emphasize that repeated abdominal examinations should be carried out at hourly or 2-hourly intervals in patients with abdominal trauma.

7629 PREOPERATIVE ANGIOGRAPHIC DIAGNOSIS OF SMALL BOWEL LEIOMYOMAS. (Eng.) Stothert, J. C., Jr.; Riaz, M. A.; Joyce, P. F.; Kaminski, D. L. (Dept. Surgery, St. Louis Univ., St. Louis, MO). *Arch. Surg.* 113(5):643-645; 1978.

The preoperative angiographic diagnosis of small bowel leiomyomas in two patients with gastrointestinal hemorrhage, the origin of which was not evident by more conventional diagnostic measures, is described. The first patient was an 82-yr-old man with melena. Gastroscopy and barium enema examination were negative, and the barium enema examination delayed the ability to obtain arteriographic studies. A jejunal tumor, which proved to be a leiomyoma, was detected by the superior mesenteric arteriogram. The second patient was a 44-yr-old man who presented with colicky lower abdominal pain and developed rectal bleeding. A bleeding diverticulum was strongly suspected. Sigmoidoscopic examination showed bleeding beyond the reach of the instrument. Emergency visceral angiography revealed a tumor in the ileal branches, suggesting leiomyoma. Both patients did well after the tumors were resected. The results in these patients and a literature review suggest that the angiographic diagnosis of leiomyoma may be indicated by the following criteria: well-circumscribed margins of tumor stain, prominent feeding arteries and veins, irregular tumor vessels giving rise to a dense stain, and small areas of pooling of contrast material in the mass.

7630 SARCOMA OF THE SMALL AND LARGE INTESTINES: CLINICAL FEATURES, TREATMENT AND PROGNOSIS. (Ger.) Ruckert, K.; Gronniger, J.; Brunner, H. (Chirurgische Universitatsklinik, Langenbeckstr. 1, 6500 Mainz, W. Germany). *Dtsch. Med. Wochenschr.* 102(45):1631-1634; 1977.

The clinical aspects, therapy, and prognosis of sarcomas of the small and large intestines are described in connection with 27 cases. The sarcoma was localized to the small intestine in 20 cases, to the colon in 5, and to the rectum in 2. Reticulosarcoma was diagnosed in 10 cases, leiomyosarcoma in 4, neurogenic sarcoma in 3, round cell sarcoma in 3, lymphosarcoma in 4, pleomorphic sarcoma in 1, and rhabdomyosarcoma in 2. Reduced health status, loss of weight, pains, intestinal bleeding, changes in defecation habits, fever, colics, palpable tumor, ileus, and peritonitis were the most frequent symptoms. The tumor was locally operable and without metastases in 6 cases, locally operable with metastases in 15, and inoperable with metastases in 6. Radical segment resection was performed in 14 cases, palliative surgery in 11, and exploratory laparotomy in 2. Two patients received postoperative radiotherapy and 14 received chemotherapy (9 patients received monochemotherapy with cyclophosphamide [6 patients], adriamycin, vincristine, or mitopodoside, and 5 received polychemotherapy with vincristine, 5-fluorouracil, methotrexate, cyclophosphamide, and prednylidene). The postoperative mortality was 30%; nine patients died from sarcoma during the 1st yr. Three patients (one with reticulosarcoma, another with neurogenic sarcoma of the small intestine, and a third with lymphosarcoma of the large intestine) have been recurrence-free for 2 yr, one patient with reticulosarcoma of the small intestine has been recurrence-free for 5 yr, one with leiomyosarcoma of the small intestine has been recurrence-free for 6 yr, and one patient with round cell sarcoma of the large intestine and another with lymphosarcoma of the small intestine have been recurrence-free for 12 and 17 yr, resp.

7631 JEJUNAL ENDOCRINE TUMOUR COMPOSED OF SOMATOSTATIN AND GASTRIN CELLS AND ASSOCIATED WITH DUODENAL ULCER DISEASE. (Eng.) Alumets, J.; Ekelund, G.; Hakanson, R.; Ljungberg, O.; Ljungqvist, U.; Sundler, F.; Tibblin, S. (Dept. Histology, Univ. Lund, Lund, Sweden). *Virchows Arch.* [*Pathol. Anat.*] 378(1):17-22; 1978.

The case of a patient with a malignant jejunal endocrine tumor associated with severe duodenal ulcer is presented. The tumor and a local metastasis were examined immunohistochemically. The tumor and the lymph node metastasis, located in the mesentery, were similar, composed of nests and trabecules of cells with weakly stained cytoplasm. Numerous somatostatin-immunoreactive cells were found in both the tumor and the metastasis, with less numerous cells that displayed gastrin immunoreactivity. This is the first reported case of intestinal somatostatinoma. The presence of gastrin cells in the tumor may explain the ulcer diathesis.

7632 EFFECT OF STEROIDS ON PATIENTS WITH POSTOPERATIVE BOWEL ANASTOMOTIC DYSFUNCTION. (Eng.) Toledo-Pereyra, L. H.; Guzman, I.; Yonehiro, E. G. (Henry Ford Hosp., 4011 E&R Building, 2799 W. Grand Blvd., Detroit, MI 48202). *Henry Ford Hosp. Med. J.* 25(4):285-292; 1977.

7633 FUNCTIONAL LYMPHANGIECTASIA OF THE DUODENAL MUCOSA. (Eng.) Femppel, J.; Lux, G.; Kaduk, B.; Roesch, W. (Med. Univ.-Klinik, Krankenhaustr. 12, Erlangen, W. Germany). *Endoscopy* 10(1):44-46; 1978.

7634 JEJUNOILEAL BYPASS SURGERY AND GRANULOMATOUS DISEASE OF THE KIDNEY AND LIVER. (Eng.) Sweet, R. M.; Smith, C. L.; Berkseth, R. O.; Crosson, J. T.; Wathen, R. L. (Hennepin County Medical Center, Minneapolis, MN). *Arch. Intern. Med.* 138(4):626-627; 1978.

7635 PARAGANGLIONEUROMA OF THE DUODENUM: AN EVOLUTIONARY HYBRID? (Eng.) Cooney, T.; Sweeney, E. C. (Sch. Pathology, Trinity Coll., Dublin, Ireland). *J. Clin. Pathol.* 31(3):233-244; 1978.

7636 INTRALUMINAL DUODENAL DIVERTICULUM: REPORT OF A CASE INVESTIGATED BY FIBEROPTIC ENDOSCOPY. (Eng.) Mathieu, B.; Salducci, J.; Remacle, J. P.; Pin, G.; Monges, H. (Hopital Nord, 13326 Marseille Cedex 3, France). *Am. J. Dig. Dis.* 23(5, Suppl.):1S-5S; 1978.

7637 IUD GANGRENE OF SMALL INTESTINE. (Eng.) Barranco, C. J. (855 Front Ave., Salamanca, NY 14779). *Am. J. Surg.* 135(5):717; 1978.

7638 MECHANICAL SMALL BOWEL OBSTRUCTION DUE TO ADHESIONS. (Eng.) Ulvik, N. M.; Qvigstad, E. (Akershus Central Hosp., Norbyhagen, Norway). *Ann. Chir. Gynaecol.* 67(1):13-16; 1978.

7639 DISSEMINATED HISTOPLASMOSIS ORIGINATING FROM INTESTINAL LESIONS. (Eng.) Makoui, C.; Barritt, A. S., III (Veterans Admin. Hosp., Salem, VA 24153). *Am. J. Dig. Dis.* 23(5, Suppl.):87S-91S; 1978.

7640 BIZARRE LEIOMYOBLASTOMA OF JEJUNUM AS A CAUSE OF FEVER OF UNKNOWN ORIGIN. (Eng.) Rabau, M. Y.; Kissin, E.; Wolfstein, I.; Rosenthal, T. (Chaim Sheba Medical Center, Tel Hashomer, Israel). *Am. J. Dig. Dis.* 23(5, Suppl.):84S-86S; 1978.

7641 PORTAL VENOUS OCCLUSION: AN UNUSUAL CAUSE OF ASCITES IN A PATIENT WITH JEJUNOILEAL BYPASS. (Eng.) Metz, R.; Gray, R.; Goldstein, L. (Univ. California at Los Angeles Center Health Sciences, Los Angeles, CA 90024). *Am. J. Dig. Dis.* 23(5, Suppl.):59S-61S; 1978.

7642 FATTY ACID ENTEROLITHS AND INTERMITTENT SMALL INTESTINAL OBSTRUCTION. (Eng.) Hosler, J. P.; Hartong, W. A.; Moeller, D. D. (Kansas Univ. Medical Center, Rainbow Blvd. at 39th St., Kansas City, KS 66103). *Am. J. Dig. Dis.* 23(5, Suppl.):28S-32S; 1978.

7643 THE VALUE OF EMERGENCY ANGIOGRAPHY IN THE DIAGNOSIS AND PROGNOSIS OF ACUTE MESENTERIC ARTERIAL INSUFFICIENCY. (Eng.) Carrasco, D.; Gordo, R.; Olaso, V.; Baguena, J.; Berenguer, J. (La Fe Hosp., Av. Alferez Provisional, 21, Valencia 9, Spain). *Am. J. Gastroenterol.* 69(3, Part 1): 295-301; 1978.

7644 CONGENITAL DUODENAL STENOSIS: THE DUODENAL CERVIX SIGN. (Eng.) Halko, M.; LoPresti, P. A.; Patel, H. D.; Chawla, S.; Marzulli, V. (Catholic Medical Center of Brooklyn & Queens, 88-25 153rd St., Jamaica, NY 11432). *Am. J. Gastroenterol.* 69(3, Part 1):323-327; 1978.

7645 SMALL BOWEL REVERSAL PROCEDURE FOR TREATMENT OF THE "SHORT GUT" BABY. (Eng.) Warden, M. J.; Wesley, J. R. (Kaiser Permanente Medical Center, 1526 N. Edgemont, Los Angeles, CA 90027). *J. Pediatr. Surg.* 13(3):321-323; 1978.

7646 ADENOMA OF DUODENAL GLANDS AS THE SOURCE OF INTESTINAL HEMORRHAGE. (Rus.) Zubov, N. A.; Artemova, L. F.; Zaitseva, L. N. (Dept. Patho-anatomy, Sverdlovsk Medical Inst., Sverdlovsk, USSR). *Khirurgiia (Mosk.)* (10):125; 1977.

7647 ERRORS IN THE DIAGNOSIS OF NONEPITHELIAL BENIGN TUMORS OF THE SMALL INTESTINE. (Rus.) Nazarov, V. G.; Dubovik, N. T.; Belov, V. N. (Municipal Clinical Oncological Dispensary, Novokuznetsk, USSR). *Khirurgiia (Mosk.)* (10):98-99; 1977.

7648 SMALL INTESTINAL CARCINOMA COMPLICATED BY PROFUSE INTESTINAL HEMORRHAGE. (Rus.) Zaporozhets, V. K.; Chupryna, V. V. (Surgical Clinic, Voroshilovgrad Medical Inst., Voroshilovgrad, USSR). *Khirurgiia (Mosk.)* (10):126-127; 1977.

7649 MELANOMA OF THE SMALL INTESTINE. (Rus.) Iakushin, V. I.; Danilin, A. A. (S. P. Botkin Clinical Hosp., Moscow, USSR). *Khirurgiia (Mosk.)* (10):127-128; 1977.

7650 COMPLICATED JEJUNAL DIVERTICULOSIS. (Fre.) Baulieux, J.; Boulez, J.; Mignotte, H.; Maillet, P. (Hopital de la Croix-Rousse,

69317 Lyon Cedex 1, France). *Lyon Chir.* 73(5): 374-376; 1977.

7651 THERAPY OF OBESITY BY SMALL INTESTINAL SHUNT OPERATION? (Ger.) Forster, H. (Zentrum der Biologischen Chemie der Universitat, Theodor-Stern-Kai 7, 6 Frankfurt/M. 70, W. Germany). *Fortschr. Med.* 95(36):2199-2202; 1977.

7652 ACUTE OCCLUSION OF THE SMALL INTESTINE BY IATROGENIC INTERNAL HERNIA. (Fre.) Mathon, C.; Vacca, C.; Piulachs, J. (No affiliation given). *Rev. Fr. Gastroenterol.* (130):7-13; 1977.

7653 ERRORS IN THE DIAGNOSIS OF INTESTINAL PERFORATION CAUSED BY FISH BONES. (Rus.) Nechiporuk, V. M.; Ostrovskii, V. P. (Faculty Pediatrics, N. I. Pirogov Vinnitsa Medical Inst., Vinnitsa, USSR). *Klin. Khir.* (10):75-77; 1977.

See also, 7272, 7449, 7454, 7463, 7474, 7475, 7476, 7478, 7479, 7492, 7507, 7508, 7510, 7566, 7573, 7577, 7578, 7579, 7584, 7598, 7615, 7617, 7659, 7667, 7685, 7721, 7915, 7916, 7919, 7925, 7929, 7930, 7935, 7936, 7946, 7947, 7954, 7955, 7957, 7958, 7959, 7960.

SMALL INTESTINE

Malabsorption

7654 INCREASED TISSUE CONCENTRATIONS OF 5-HYDROXYTRYPTAMINE IN THE DUODENAL MUCOSA OF PATIENTS WITH COELIAC DISEASE. (Eng.) Challacombe, D. N.; Dawkins, P. D.; Baker, P. (Taunton and Somerset Hosp., Taunton, Somerset, England). *Gut* 18(11):882-886; 1977.

To investigate the relationship between the hyperactivity or hyperplasia of enterochromaffin (EC) cells in the duodenum and the abnormalities of 5-hydroxytryptophan (5-HT) metabolism in celiac disease, tissue levels of 5-HT were estimated in the duodenal mucosa of four adults and seven children with untreated celiac disease. The results were compared with a control group of four adults and six children with normal duodenal mucosa by light microscopy. The wet weight of duodenal tissue and its protein content were not significantly different in the patients and controls. Tissue concentrations of 5-HT related either to tissue weight or to tissue protein were significantly higher ($p<0.001$) in patients with celiac disease than in controls (10.8 ± 4.0 versus 4.2 ± 2.0 µg 5-HT/g tissue or 144.5 ± 39.8 versus 55.3 ± 17.9 µg 5-HT/g tissue protein). There were no significant differences between the adults and children in each group. When three children with celiac disease were challenged p.o. with gluten powder (10 g t.i.d. for 10 days), their tissue 5-HT concentrations rose from prechallenge values similar to those of the control patients to postchallenge values that were much higher, and the severity of duodenal histopathological changes increased. Further studies will be required to determine whether the raised tissue levels of 5-HT are due to hyperplasia or to hyperactivity of EC cells or to both.

7655 CORRECTION OF COBALAMIN MALABSORPTION IN PANCREATIC INSUFFICIENCY WITH A COBALAMIN ANALOGUE THAT BINDS WITH HIGH AFFINITY TO R PROTEIN BUT NOT TO INTRINSIC FACTOR: IN VIVO EVIDENCE THAT A FAILURE TO PARTIALLY DEGRADE R PROTEIN IS RESPONSIBLE FOR COBALAMIN MALABSORPTION IN PANCREATIC INSUFFICIENCY. (Eng.) Allen, R. H.; Seetharam, B.; Allen, N. C.; Podell, E. R.; Alpers, D. H. (Washington Univ. Sch. Medicine, St. Louis, MO 63110). *J. Clin. Invest.* 61(6):1628-1634; 1978.

The hypothesis that the etiology of cobalamin (Cbl) malabsorption in pancreatic insufficiency is an inability to partially degrade R protein because of a lack of pancreatic proteases was tested by determining the ability of a nonradioactive Cbl analogue, bound with high affinity by R protein but not by intrinsic factor (IF), to correct the malabsorption of ^{57}Co-Cbl in three patients with pancreatic insufficiency. R protein bound the Cbl analogue known as cobinamide with affinities that were the same and only 14-fold lower than those for Cbl at pH 8 and pH 2, resp. Cobinamide was bound by IF with affinities that were 600,000- and 10,000-fold lower than those for Cbl at pH 8 and 2, resp. The addition of 125 pmol of nonradioactive cobinamide to 0.5 pmol of ^{57}Co-Cbl before being added to 1 pmol of R protein and 1 pmol of IF, markedly inhibited the ability of R protein to compete with IF for binding the ^{57}Co-Cbl. Similar results were obtained with freshly aspirated gastric juice. This change was essentially indistinguishable from that observed previously when R protein or R protein-^{57}Co-Cbl was incubated *in vitro* with trypsin. The p.o. administration of 100 nmol of nonradioactive cobinamide in Schilling tests was equivalent to trypsin in its ability to completely

correct the malabsorption of 0.4 nmol of ^{57}Co-Cbl in the three patients with pancreatic insufficiency. The fact that both trypsin and nonradioactive cobinamide inhibit the ability of R protein to compete with IF for ^{57}Co-Cbl binding *in vitro*, and correct the malabsorption of ^{57}Co-Cbl in patients with pancreatic insufficiency *in vivo*, supports the hypothesis that the primary defect in Cbl absorption in this disease is an inability to partially degrade R protein because of a lack of pancreatic proteases.

7656 MUCOSAL RECOVERY IN TREATED COELIAC DISEASE [Abstract]. (Eng.) McNicholl, B.; Egan-Mitchell, B.; Fottrell, P. F. (No affiliation given). *Acta Paediatr. Belg.* 29(2):133; 1976.

7657 HISTOCHEMICAL EXAMINATION OF JEJUNAL GAMMA-GLUTAMYLTRANSPEPTIDASE (GGTP) ACTIVITY IN COELIAC DISEASE [Abstract]. (Eng.) Zalewski, T.; Wozniewicz, B.; Radzikowski, A.; Klos, J. (No affiliation given). *Acta Paediatr. Belg.* 29(2):135; 1976.

7658 HYPOVITAMINOSIS K IN COELIAC DISEASE. (Eng.) Rodesch, P.; Cadranel, S.; Winckler, M.; Loeb, H. (Hopital Saint-Pierre, Rue Haute, 320 B-1000 Bruxelles, Belgium). *Acta Paediatr. Belg.* 29(3):123-124; 1976.

7659 "TYPE 3" BILE ACID MALABSORPTION AND DIARRHEA--EVIDENCE FOR A NEW CLINICAL ENTITY [Abstract]. (Eng.) Fromm, H.; Farivar, S.; McJunkin, B. (Dept. Medicine, Univ. Pittsburgh, Pittsburgh, PA). *Gastroenterology* 72(5, Part 2):1060; 1977.

7660 LACTOSE MALABSORPTION IN ADULT VIETNAMESE. (Eng.) Nong The Anh; Tran Kiem Thuc; Welsh, J. D. (Univ. Hosp. and Clinics, P.O. Box 25606, Oklahoma City, OK 73125). *Am. J. Clin. Nutr.* 30(4):468-469; 1977.

7661 LACTOSE MALABSORPTION IN MEXICAN-AMERICAN ADULTS. (Eng.) Woteki, C. E.; Weser, E.; Young, E. A. (Dept. Nutrition and Food, Drexel Univ., Philadelphia, PA). *Am. J. Clin. Nutr.* 30(4):470-475; 1977.

7662 EFFECTS OF AGE ON LACTOSE MALABSORPTION IN OKLAHOMA NATIVE AMERICANS AS DETERMINED BY BREATH H_2 ANALYSIS. (Eng.) Caskey, D. A.; Payne-Bose, D.; Welsh, J. D.; Gearhart, H. L.; Nance, M. K.; Morrison, R. D. (Dept. Food, Nutrition and Inst. Admin., Oklahoma State Univ., Stillwater, OK 74074). *Am. J. Dig. Dis.* 22(2):113-116; 1977.

See also, 7946, 7917, 7946, 7955.

LARGE INTESTINE

7663 A RANDOMIZED PROSPECTIVE EVALUATION OF ORALLY ADMINISTERED ANTIBIOTICS IN OPERATIONS ON THE COLON. (Eng.) Vargish, T.; Crawford, L. C.; Stallings, R. A.; Wasilauskas, B. L.; Myers, R. T. (Bowman Gray Sch. Medicine, Winston-Salem, NC). *Surg. Gynecol. Obstet.* 146(2):193-198; 1978.

The usefulness of orally administered antibiotics in the preoperative preparation of the intestine was investigated in colon specimens from 91 patients who underwent 3 days of mechanical preparation of the intestine and who were given one of three antibiotic groups the day before operation: neomycin and erythromycin base (NE), neomycin-phthalylsulfathiazole (NP), or neomycin (control, N). There were no significant differences among the three groups in terms of the types of operations performed. The baseline for comparison was established using samples from unprepared colon: 10^4-10^5 organisms/0.1 g tissue. By this standard, 6/91 treated colons were bacteriologically unprepared (3 in the N group, 2 in the NE group, and 1 in the NP group), 25/91 colons were sterile (<10 organisms/0.1 g tissue; 10 in N, 10 in NE, and 5 in NP), and 60/91 were bacteriologically prepared (10-10^3 organisms/0.1 g tissue, with no significant differences among the groups). There was no association of any significant postoperative complication with any specific antibiotic preparation. The incidence of postoperative diarrhea was <7% and correlated better with the operative procedure than with the preoperative antibiotic. The wound infection rate ranged from 10% in the NE group to 12.5% in the N group, and these rates are extremely close to published national averages

for operations on the colon. The wound infections occurred in patients with bacteriologically prepared colons, and 60% of them involved organisms either absent from the colon or present below the counting resolution (<10/0.1 g tissue) at the time of operation, indicating that adequate tissue levels of the antibiotics had not been reached. It is concluded that, while p.o. antibiotic therapy provides adequate intestinal antisepsis, there is possibly an advantage to parenteral antibiotic therapy in preparation for operations where adequate tissue antisepsis is desirable.

7664 NEONATAL SMALL LEFT COLON SYNDROME. (Eng.) Stewart, D. R.; Nixon, G. W.; Johnson, D. G.; Condon, V. R. (Univ. Kansas Medical Center, 39th and Rainbow Blvd., Kansas City, KS 66103). *Am. Surg.* 186(6):741-745; 1977.

The case reports, clinical findings, course, radiographic findings, pathology, and treatment of four patients with the neonatal small left colon syndrome (SLCS) are presented. All infants had a history suggesting a low intestinal obstruction within the first 24-48 hr after birth. Three were born to diabetic mothers who had toxemia or polyhydramnios during pregnancy. These three infants had persistant fetal circulation syndrome hypoglycemia and cyanosis shortly after birth. The gestational age of the four infants was between 36 and 40 weeks, and their weights ranged between 2,400 and 4,500 g. Abdominal distention was present, and the spontaneous passage of meconium was unusual. Plain abdominal roentgenograms showed dilated bowel in all four cases, and a pneumoperitoneum was present initially in two cases. Contrast enema examination showed a colon of significantly reduced caliber from the anus to the splenic flexure, and there was generally a transition zone at the splenic flexure; this zone was longer than the one seen with Hirschsprung's disease. The colon proximal to the transition zone was dilated and distended with meconium. In each instance, the entire colon was readily filled. Histologic examination in one patient showed an increased ratio of small cells to multipolar ganglion cells. Three patients were operated upon because of the presence of a pneumoperitoneum. Two of these patients had cecal perforation, and both died of symptoms of heart disease shortly after surgery. The third patient had multiple ileal perforations in a marginally viable ileum. The affected portion was excised and an ileostomy was done; the patient survived. The fourth patient had no complications, and passed normal stools following a second barium enema. These observations suggest that SLCS is not a benign disease but that it can be fully cured by radiographic contrast enemas if detected early.

7665 ABDOMINAL SCINTIPHOTOGRAPHY WITH ^{99m}TECHNETIUM-LABELLED ALBUMIN IN ACUTE GASTROINTESTINAL BLEEDING: AN EXPERIMENTAL STUDY AND A CASE REPORT. (Eng.) Miskowiak, J.; Munck, O.; Nielsen, S. L.; Andersen, B. (Bispebjerg Hosp., Bispebjerg Bakke, DK-2400 Copenhagen, Denmark). *Lancet* 2(8043):852-854; 1977.

A new diagnostic method for the detection of the bleeding site in acute gastrointestinal bleeding is described, and the method was tested in five volunteers and in one patient with acute bleeding. ^{99m}Technetium-labeled human serum albumin (1 mCi) is injected i.v., and the distribution of radioactivity in the abdomen is followed for 40 to 60 min by sequential scintiphotography. The site of simulated gastrointestinal bleeding was identified in all five volunteers. In the patient, a 91-yr-old man with severe bleeding from diverticula of the sigmoid colon, the method gave a correct estimate of the bleeding site and of its bleeding rate. These preliminary results suggest that this quick, noninvasive, easy technique may be useful in the diagnosis of gastrointestinal bleeding.

7666 VASCULAR DYSPLASIA OF THE RIGHT COLON: AN IMPORTANT CAUSE OF UNEXPLAINED GASTROINTESTINAL BLEEDING. (Eng.) Broor, S. L.; Parker, H. W.; Ganeshappa, K. P.; Komaki, S., Dodds, W. J. (Medical Coll. Wisconsin, Milwaukee, WI). *Am. J. Dig. Dis.* 23(1):89-92; 1978.

The case of a 73-yr-old man with vascular dysplasia of the right colon is presented to emphasize the problems in diagnosis and discuss the value of different diagnostic methods as revealed in the literature for patients with chronic lower-gastrointestinal hemorrhage. The patient had a 3-yr history of frequent, intermittent black stools and occasional bright red blood in the stools, but there was no history of hematemesis, abdominal pain, anorexia, weight loss, or excessive alcohol consumption and no family history of any bleeding diasthesis. Numerous stool specimens were strongly guaiac-positive. The only other abnormal findings in routine studies were several diverticula of the left colon (by barium enema and pneumocolon examinations) and a small hiatal hernia (by roentgenographic examination of the upper gastrointestinal tract and a small bowel series). However, colonoscopic findings (a 2-cm in diameter, flat, reddish area in the ascending colon with irregular prominent blood vessels) and arteriographic findings (an area of irregular blood vessels in the upper ascending colon with early venous filling) were considered typical of vascular dysplasia. At laparotomy, a right hemicolectomy was performed, and the patient was well at 9-month follow-up. In chronic lower gastrointestinal hemorrhage, routine diagnostic studies may fail as much as 50% of the time, and negative findings at laparotomy may occur in as many as 70% of the cases. Arteriography and colonoscopy are extremely valuable diagnostic tools, especially in cases of vascular dysplasia, which are seldom within sigmoidoscopic reach and in which barium enema is often negative. The possibility of vascular dysplasia should be considered in any patient with chronic, obscure lower gastrointestinal bleeding.

7667 INTRALUMINAL CALCIFICATIONS IN THE SMALL BOWEL OF NEWBORN INFANTS WITH TOTAL COLONIC AGANGLIONOSIS. (Eng.) Fletcher, B. D.; Yulish, B. S. (Univ. Hosp. Cleveland, University Circle, Cleveland, OH 44106). *Radiology* 126(2):451-455; 1978.

The cases of four neonates with total colonic aganglionosis in whom intraluminal calcifications were found in the small bowel are presented. Abdominal radiography demonstrated circular aggregations of small punctate calcific densities in the right lower quadrant and evidence of bowel obstruction. There was a microcolon in each case. The calcifications resembled those seen in small intestinal atresia and stenosis and are probably related to fetal intestinal stasis. Since in the 11 previously reported cases of intraluminal small intestinal calcifications the obstruction was not associated with meconium ileus or cystic fibrosis, intraluminal small bowel calcifications are likely to be associated with either small bowel atresia or total colonic aganglionosis.

7668 PSEUDOMEMBRANOUS COLITIS: PRESENCE OF CLOSTRIDIAL TOXIN. (Eng.) Larson, H. E.; Price, A. B. (Clinical Res. Center, Watford Rd., Harrow, Middlesex HA1 3UJ, England). *Lancet* 2(8052/8053):1312-1314; 1978.

To identify the toxin involved in pseudomembranous colitis (PMC), the feces of 9 patients with histologically-proven PMC were studied and compared with results of similar studies in 18 other patients with other bowel diseases. Five of 9 and 2 of 18 patients had recently been treated with one or more of the antibiotics lincamycin, clindamycin, and ampicillin. A toxin was found in 9/9 PMC patients and in the 2/18 with antibiotic-associated nonspecific colitis; it was neutralizable by *Clostridium sordelli* antitoxin (detectable to titers of 1/100 or greater except for one case at 1/10,000) but not by gas gangrene antitoxin (a commercial preparation of *C. welchii, C. edematiens,* and *C. septicum* antitoxins), but the effect was morphologically different in the latter 2 patients. The tissue culture cytopathic effect (CPE) was produced by fecal extracts from all 11 patients and was neutralized in all cases by *C. sordelli* antitoxin; gas gangrene antitoxin did not neutralize the effect in the 9 PMC patients. When guinea pigs were inoculated with extracts from the feces of two PMC patients (tissue culture titers of 1/256 and 1/10,000), the results were comparable to those reported to follow inoculation with *C. sordelli* culture filtrates: the extract of lower titer produced a transient local edema; the more potent extract produced a massive, gelatinous, s.c. edema over the entire abdominal wall; and these animals died in 5-8 days after progressive weight loss and weakness. The PMC fecal toxin extract and *C. sordelli* extract both produced characteristic toxic CPE when inoculated into cultures of M.R.C. V cells. PMC fecal toxin was inactivated by heating at 56 C for 30 min, by incubation at pH 4 for 24 hr, and by incubation with specific antitoxin for 1 hr. These results compare well with previously obtained results for *C. sordelli* toxin. The results indicate that a specific clostridial toxin is closely associated with PMC and that it is similar to *C. sordelli* in many of its *in vivo* and *in vitro* properties.

7669 VALUE OF COLOSCOPY IN THE DETECTION OF SIGMOID MALIGNANCY IN PATIENTS WITH DIVERTICULAR DISEASE. (Eng.) Glerum, J.; Agenant, D.; Tytgat, G. N. (Wilhelmina Gasthuis, Eerste Helmersstraat 104, Amsterdam Oud-West, Netherlands). *Endoscopy* 9(4):228-230; 1978.

The contribution of coloscopy to the diagnosis of sigmoid carcinoma in 52 patients with diverticular disease was evaluated. Coloscopy in 30 diverticular disease patients without suspicion of malignancy demonstrated diverticulosis/diverticulitis in 19 patients, diverticulosis plus polyp in 4, malignancy in 2, and extrinsic compression in 2; the diseased segment was not reached in 3 patients. Coloscopy in 22 diverticular disease patients suspected of having co-existing malignancy of the sigmoid colon revealed carcinoma in 10 patients, diverticulosis/diverticulitis in 3, diverticulosis plus polyp in 1, and benign stenosis after resection in 2; the disease segment was not reached in 6 patients. Malignancy was subsequently demonstrated by radiology in the two patients with stenosis after resection and at surgical exploration in one of the six patients suspected of having co-existing malignancy but not reached by coloscopy. There were no false-positive or -negative cases. The results demonstrate that coloscopy is useful for reaching a correct diagnosis when concomitant malignancy of the sigmoid colon is suspected in diverticular disease patients.

7670 SOLITARY DIVERTICULUM OF THE CAECUM AND ITS COMPLICATIONS. (Eng.) Peltokallio, P.; Tykka, H.; Myllarniemi, H. (Second Dept. Surgery, Univ. Helsinki, SF-00290 Helsinki 29, Finland). *Ann. Chir. Gynaecol.* 66(5):230-233; 1977.

The case reports of three patients with cecal diverticula are presented. The patients were all men, and two were younger than those usually having diverticulitis of the colon (30 and 38 yr, resp.). Acute appendicitis had been diagnosed preoperatively in all three cases in view of the symptoms, clinical findings, and laboratory findings. At laparotomy, the appendix was normal in each case. In the first patient, the diverticulum was situated 1 cm from the base of the appendix and was completely necrotic. It was perforated and contained a fecolith, which was probably responsible for the inflammation seen. The diverticulum in the second patient was located 4 cm from the base of the appendix on the lateral wall of the cecum. The third patient had a diverticulum surrounded by a large inflammatory, necrotic mass. The diverticula were excised, and the mass was removed with a right-sided hemicolectomy. In view of the possibility that carcinoma may complicate these diverticula, the authors support an aggressive approach to the treatment of inflammatory masses of the cecal wall.

7671 NECROTIZING ENTEROCOLITIS (ISCHEMIC ENTEROPATHY) WITH THE SEQUEL OF COLONIC ATRESIA. (Eng.) Beardmore, H. E.; Rodgers, B. M.; Outerbridge, E. (Montreal Children's Hosp., Montreal, Quebec, Canada). *Gastroenterology* 74(5, Part 1):914-917; 1978.

Two cases of acquired colonic atresia subsequent to necrotizing enterocolitis (ischemic enteropathy) in the neonatal period are reported. The first patient, a boy born at 33 weeks gestation, developed symptoms of necrotizing enterocolitis at 5 days of age. The patient had extensive gas in the bowel wall and subsequently developed pneumoperitoneum. At laparotomy, extensive peritonitis was encountered with a perforation of the distal ileum. The diseased distal 10 cm of ileum and right colon were resected, and an ileostomy was created. The patient began tolerating p.o. alimentation, and a second laparotomy was performed with the intention of restoring intestinal continuity 11 weeks later. At this time, two areas of obstruction were found in the colon. A segment of proximal colon was resected and showed marked edema and submucosal fibrosis consistent with previous neonatal ischemic enteropathy. A revision of the ileostomy and mucous fistula was undertaken, and at 8 months of age, a subtotal colectomy and ileoproctostomy was performed. The second patient, a boy born at 30 weeks of gestation, developed symptoms of necrotizing enterocolitis on the day of birth. An abdominal radiograph revealed extensive pneumatosis intestinali with air within the portal venous system. Free air was also noted in the peritoneal cavity. At laparotomy, he was found to have severe peritonitis and terminal ileal perforation. The terminal 12 cm of ileum and right colon were resected, and an ileostomy was carried out. At 8 weeks of age, an ileotransverse colostomy was performed, but the patient failed to pass stools per rectum. Complete atresia of the colon in the region of the splenic flexure was encountered. An ileodescending colostomy was performed. Recognition of colonic atresia and other late sequelae of ischemic enterocolitis becomes critical to the successful outcome of these patients as survival rates increase.

7672 ANORECTAL MYECTOMY IN TREATMENT OF ULTRA-SHORT SEGMENT HIRSCHSPRUNG'S DISEASE: REPORT OF 26 CASES. (Eng.) Scobie, W. G.; Mackinlay, G. A. (Western General Hosp., Crewe Rd., Edinburgh EH4 2XU, Scotland). *Arch. Dis. Child.* 52(9):713-715; 1977.

Experience with 140 children (ages 6 months-14 yr) in the period 1971-75 who were investigated for constipation and soiling is presented. All children had had chronic constipation from the 1st yr of life; 35% had had continuous soiling. All were investigated by anorectal manometry; 26 failed to show an inhibition response to rectal dilatation, suggesting Hirschsprung's disease, and were treated by anorectal myectomy. In 24 of the 26, the disease was confirmed histologically; 2 specimens were diagnostically unsuitable. In 21 myectomy specimens, large abnormal nerve bundles and the absence of ganglion cells were found; 9/21 were totally aganglionic while 12/21 showed normal ganglia or a transitional zone of scattered ganglia at the upper end. Four required repeat myectomies to get above the aganglionic zone, with myectomy repeated twice in two. Three patients required anterior resection. In five myectomy specimens, large nerve bundles and muscle hypertrophy were seen. At follow-up, no patient was soiling, 17 patients achieved normal regular bowel movements after the initial myectomy, and the remaining 9 had normal function after repeat procedures. A diagnosis of Hirschsprung's disease should be considered in children with chronic constipation. An accurate neonatal history of bowel function and testing of anorectal pressure will aid the diagnosis. Anorectal myectomy is a simple procedure, often free of complications, that can be combined with anterior resection when the length of affected segment is too long for myectomy alone; these procedures offer effective palliation.

7673 PNEUMATOSIS CYSTOIDES COLI. (Eng.) Marshak, R. H.; Lindner, A. E.; Maklansky, D. (Mt. Sinai Sch. Medicine, City Univ. New York, New York, NY). *Gastrointest. Radiol.* 2(2):85-89; 1977.

The pathology, clinical features, roentgenographic features, and differential diagnosis of pneumatosis cystoides coli are reviewed. If the cysts are subserosal in location they are visible in the unopened specimen. On section, the bowel wall is honeycombed with gas cysts. The cysts are most often lined by a layer of endothelial cells. Diseases associated with pneumatosis cystoides coli include collagen disease, diabetes, colonic ischemia, inflammatory bowel disease, traumatic endoscopy, and polyp excision. Pneumatosis may be discovered as an incidental finding during examination for some other illness or abdominal cramps, diarrhea, and rectal bleeding may occur. Plain abdominal films may reveal grape-like radiolucent clusters along the contour of the colon and in the region of the mesentery. The clusters of air associated with pneumatosis cystoides coli can be readily distinguished from gas in abscess cavities because in pneumatosis there are discrete, sharply defined borders, and the cysts are distributed along the contours of the colon. The rectum is rarely involved, and the left colon is more frequently involved than the right. Barium enema examination reveals filling defects between the lumen, outlined by barium, and the outer margin of the bowel wall.

7674 RETRACTILE MESENTERITIS: INITIAL PRESENTATION AS COLONIC OBSTRUCTION. (Eng.) Williams, R. G.; Nelson, J. A. (Univ. Utah Medical Center, 50 N. Medical Drive, Salt Lake City, UT 84132). *Radiology* 126(1):35-37; 1978.

Two cases of apparent idiopathic mesenteric fibrosis in which the most significant problem was di-

rectly referable to the colon are presented. Both patients, a 54-yr-old woman and a 47-yr-old man, presented with signs and symptoms of bowel obstruction and a firm abdominal mass. Both had been relatively healthy prior to the onset of illness. Neither had a known family history of this or other fibrosing processes, or of exposure to allergens. There was no evidence of any coexistent neoplasm. In the first patient, a preoperative plain abdominal radiograph revealed a pattern consistent with mechanical small bowel obstruction. A barium enema examination revealed obstruction of the descending colon and apparent mucosal thumbprinting associated with a mass lesion. At operation, she was found to have multiple small and large bowel obstructions with progressive mesenteric colonic fibrosis and extensive fibrotic implants over the small bowel. A subtotal colectomy with an ileostomy and mucus fistula formation was carried out. Barium enema examination in the second patient revealed partial splenic flexure obstruction and mucosal thumbprinting. Because of near complete obstruction of the distal colon, a side-to-side transverse-to-distal sigmoid colostomy was carried out. The clinical history and findings of an obstructive lesion in the colon, where cancer is not necessarily suspected, should lead to a consideration of this entity for the radiographic diagnosis.

7675 VOLVULUS OF SIGMOID COLON IN CHILDHOOD--AN ENTITY TOO LITTLE REGARDED. (Ger.) Willmen, H. R.; Schultz-Stubner, A. (Chirurgische Klinik, Kreiskrankenanstalten Grevenbroich, 4048 Grevenbroich, W. Germany). *Aktuel. Chir.* 12(5): 327-332; 1977.

The causes, symptoms, and treatment of sigmoid volvulus in children are described in connection with 12 cases observed since 1974. The patients included nine boys and three girls aged 9-15 yr. Abrupt body movement at gymnastics or play was the cause of volvulus in all cases. The volvulus manifested as sudden violent pain in the left lower abdomen, causing local tenderness and defense and hemiflexion of the left hip and knee. The transverse sigmoid coil was palpable rectally. Two-thirds of the patients developed vertigo and nausea. The patients showed a tendency to obstipation, but complete intestinal shock with hyperthermy and toxic dyspnea did not occur. The therapy was conservative in 11 cases; it consisted of bimanual detorsion (bringing immediate relief to 7 cases) and of contrast enema in 2. Bimanual detorsion can be regarded successful only if the patient has no pains after massive defecation. Operative detorsion and mesosigmoidopexy at the lateral abdominal wall was necessary in one case. Sigmoidopexy is always indicated in the case of recurrent volvulus.

7676 OBSERVATIONS OF GARDNER'S SYNDROME. (Ger.) Bosseckert, H.; Knoll, P.; Kuhne-Heid, R. (Medizinische Universitats-Klinik, Bachstr. 18, DDR-69 Jena, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(5/6):255-261; 1977.

7677 X-RAY SIGNS OF HIRSCHSPRUNG'S DISEASE IN INFANCY. (Hun.) Koteles, G.; Ujvary, M.; Szirmai, Z. (Rontgenosztaly, Madarasz utcai Csecsemo es Gyermekkorhaz, Budapest, Hungary). *Orv. Hetil.* 117(47):2857-2862, *passim;* 1976.

7678 CLINICAL AND THERAPEUTIC ASPECTS OF SPONTANEOUS INTRAMURAL INTESTINAL HEMORRHAGE OCCURRING DURING ANTICOAGULANT TREATMENT. (Ger.) Huber, F. B. (Krankenhaus, CH-8810 Horgen, Switzerland). *Chirurg* 48(8):534-540; 1977.

7679 REDUCTION OF THE TISSUE LEVEL OF VASOACTIVE INTESTINAL POLYPEPTIDE (VIP) IN HIRSCHSPRUNG'S DISEASE [Letter to Editor]. (Fre.) Dupont, C.; Besson, J.; Laburthe, M.; Bataille, D.; Rosselin, G.; Navarro, J. (INSERM U-55, Hopital Saint-Antoine, 184 rue du Faubourg Saint-Antoine, Paris Cedex 12, France). *Nouv. Presse Med.* 6(40): 3752-3753; 1977.

7680 ERRORS IN THE DIAGNOSIS AND TREATMENT OF HIRSCHSPRUNG'S DISEASE. (Rus.) Kushch, N. L. (Dept. Pediatric Surgery, Donetsk Medical Inst., Donetsk, USSR). *Khirurgiia (Mosk.)* (1):100-104; 1978.

7681 ANORECTAL INCONTINENCE: RESULTS OF SURGICAL TREATMENT. (Ger.) Stelzner, F. (Chirurgische Universitatsklinik, D-5300 Bonn-Venusberg, W. Germany). *Chirurg* 48(7):451-456; 1977.

7682 TREATMENT OF INTESTINAL INVAGINATION IN CHILDREN. (Rus.) Khristich, A. D.; Portnoy, V. M. (Dept. Pediatric Surgery, Dnepropetrovsk Medical Inst. Dnepropetrovsk, USSR). *Klin. Khir.* (6):9-12; 1977.

7683 DECOMPRESSION OF THE INTESTINE IN ILEUS. (Ger.) Richter, J.; Graetz, H. (Bezirkskrankenhauses "Heinrich Braun," Karl-Keil-Str. 35, DDR-95 Zwickau, E. Germany). *Zentralbl. Chir.* 103 (3):189-191; 1978.

7684 PREVENTION AND TREATMENT OF POSTOPERATIVE INTESTINAL ATONIA AND OTHER FORMS OF PARALYTIC ILEUM WITH BEPANTHEN® ROCHE. (Ger.) Hanck, A. (Abteilung fur Sozial- und Praventivmedizin, Universitat Basel, Basel, Switzerland). *Therapiewoche* 27(39):6878-6887, *passim;* 1977.

7685 SO-CALLED SPONTANEOUS INTESTINAL PERFORATION. (Ger.) Tonak, J.; Filler, D. (Chirurgische Universitatsklinik, Krankenhausstrasse 12, D-8520 Erlangen, W. Germany). *Chirurg* 48(5): 334-338; 1977.

7686 FAMILIAL DIFFUSE POLYPOSIS OF THE COLON [Abstract]. (Ger.) Egger, G.; Baumgart-

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7692 ANTIBIOTIC PROPHYLAXIS IN SURGERY OF THE COLON. (Eng.) Polk, H. C., Jr. (Univ. Louisville Sch. Medicine, Louisville, KY 40201). *South Med. J.* 70(Suppl. 1):27-31; 1977.

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7710 EXSANGUINATING UNCONTROLLABLE LOWER GASTROINTESTINAL HEMORRHAGE DUE TO JUVENILE POLYPOSIS: REPORT OF A CASE. (Eng.) Middleton, P.; Ferguson, W. (Washington Hosp. Center, Washington, DC). *Dis. Colon Rectum* 20(8):690-694; 1977.

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7718 FLEXIBLE SIGMOIDOSCOPY: AN EFFECTIVE SCREENING TEST FOR COLONIC POLYPS [Abstract]. (Eng.) Lipshutz, G. L.; Katon, R. M.; McCool, M. F.; Mayer, B.; Smith, F. W.; Melnyk, C. S. (Univ. Oregon Health Sciences Center, Portland, OR). *Clin. Res.* 26(2):11A; 1978.

7719 PROTEOLYTIC ENZYMES: A SUPPORTIVE THERAPY IN COLON CARCINOMA PATIENTS ALREADY RECEIVING 5-FU [Abstract]. (Eng.) Werk, W.; Wischerath, H. (Dept. Serology, Univ. Munich, Munich, W. Germany). *Cancer Immunol. Immunother.* 3(Suppl.):S31; 1977.

7720 MANOMETRIC AND ELECTROMYOGRAPHIC INVESTIGATIONS AFTER TREATMENT OF FECAL INCONTINENCE BY AN INTRA-ANAL PLUG ELECTRODE [Abstract]. (Eng./Ger.) Fiedel, U.; Larkamp, H.; Stock, W.; Muller, I. N. (Chirurgische Universitatsklinik Koln, Josef Stelzmann-Str. 9, D-5000 Koln 41, W. Germany). *Langenbecks Arch. Chir.* 345:614; 1977.

7721 ALTERED INTESTINAL SENSITIVITY TO BILE ACIDS AND SMALL INTESTINAL SECRETION IN IRRITABLE BOWEL SYNDROME ASSOCIATED WITH DIARRHEA [Abstract]. (Eng.) Rask-Madsen, J.; Oddsson, E.; Krag, E. (Herlev Hosp., Copenhagen, Denmark). *Gut* 18(11):A963-A964; 1977.

See also, 7275, 7459, 7478, 7479, 7487, 7495, 7499, 7625, 7630, 7639, 7643, 7653, 7723, 7725, 7726, 7865, 7889, 7915, 7918, 7919, 7929, 7933, 7934, 7936, 7939, 7947, 7948, 7953, 7954, 7957, 7958, 7959, 7964, 7971.

Ulcerative Colitis

7722 SKIN TEST REACTIVITY IN INFLAMMATORY BOWEL DISEASE IN THE UNITED STATES AND CZECHOSLOVAKIA. (Eng.) Thayer, W. R., Jr.; Fixa, B.; Komarkova, O.; Charland, C.; Field, C. E. (Rhode Island Hosp., 593 Eddy St., Providence, RI 02902). *Am. J. Dig. Dis.* 23(4):337-340; 1978.

Patients with inflammatory bowel diseases and controls in the United States and in Czechoslovakia were tested with five skin test antigens at two different dilutions to elicit some evidence of anergy. *Candida* was first injected as a 1:1,000 dilution; if this initial skin test was negative, a second strength dilution (1:100) was then administered. Mumps was injected intradermally at 2 complement-fixing units, and no second strength antigen was used. Purified protein derivative (PPD) was injected intradermally at 1 US unit, and if this was negative, 5 US units were injected. Streptokinase-streptodornase (SK-SD) was first used as a combination of 100 U streptokinase and 25 U of streptodornase. If the response to the first strength was negative, a second injection of 400 U of SK and 100 U of SD was injected. Trichophytin was injected first as a 1:100 dilution, and the second strength was 1:30. No skin test anergy was found to exist when patients were compared to controls. The incidence of PPD responsiveness in the Czechoslovakian subjects was greater than in the United States subjects ($p<0.01$ for patients and $p<0.001$ for controls). When reactivity to first-strength injections only was assessed, no significantly diminished responsiveness was apparent between the two populations or between any patient group and its controls. Comparisons based on the number of individuals responding positively to 0, 1, 2, 3, 4, or 5 out of 5 skin test antigens demonstrated that no significant differences were encountered between the two populations or between any patient group and its controls. There is no evidence of anergy as assessed by diminished skin test reactivity in patients with inflammatory bowel diseases.

7723 UROLITHIASIS IN CHRONIC INFLAMMATORY BOWEL DISEASE. (Eng.) Knudsen, L.; Marcussen, H.; Fleckenstein, P.; Pedersen, E. B.; Jarnum, S. (Rigshospitalet, DK-2100, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 13(4):433-436; 1978.

A retrospective clinical study of the occurrence of urinary calculi was analyzed in 494 consecutive but partially selected patients with chronic inflammatory bowel disease (CIBD) to elucidate the mechanism of stone formation. By restricting the analysis only to patients studied by i.v. pyelography (IP), the material was curtailed to 140 patients with Crohn's disease (CD) and 88 with ulcerative colitis (UC). Urolithiasis was proved by IP in 18/140 patients with CD and 17/88 with UC, with no significant difference between the two groups or by sex in either group. There were no significant correlations of urolithiasis to duration of disease, history of ileostomy, site of lesion, or extent of disease. Urolithiasis was significantly correlated to a history of small bowel resection ($p<0.01$), most strongly so in those with resections ≥ 50 cm in length. Only among patients with UC was urolithiasis more common among the steroid-treated than among the non-steroid-treated ($p<0.01$). Urolithiasis was also significantly increased in patients with urinary tract obstruction ($p<0.05$ for CD, $p<0.01$ for UC). The results are consistent with the hypothesis that the hyperabsorption of oxalate following ileal resection plays an important role in stone formation. The essential role of local factors in stone formation is apparent from the increased incidence of calculi in patients with urinary tract obstruction. The few and negligible symptoms of and sequelae to urolithiasis in CIBD encourage a conservative attitude.

7724 THE DILEMMA OF PRESERVATION OF THE RECTUM: RETENTION OF THE RECTUM IN COLECTOMY FOR INFLAMMATORY DISEASE OF THE BOWEL. (Eng.) Mavroudis, C.; Schrock, T. R. (Dept. Surgery, Univ. California, San Francisco, CA). *Dis. Colon Rectum* 20(8):644-648; 1977.

The records of 100 consecutive patients who underwent total abdominal colectomy, proctectomy, or both for inflammatory bowel diseases at one hospital between 1966 and 1976 are reviewed to determine the validity of the current policy in which the rectum is retained and anastomosed to the ileum only when the rectum is not involved by inflammatory disease. The rectum was preserved at the time of colectomy in 58 patients, but only 18 had normal rectums at the initial operation. Only nine patients underwent ileoproctostomy, six primarily and three secondarily. Only three patients are living with ileoproctostomy; among the remaining patients, one died of colonic cancer, three subsequently underwent proctectomy, and two have a defunctionalized rectum with ileostomy. These results indicate that when the rectum is involved by inflammatory disease, it is advisable to do a proctectomy to eliminate the risk of cancer and to restore patients to productive lives.

7725 TOTAL COLECTOMY AND MUCOSAL PROCTECTOMY WITH PRESERVATION OF CONTINENCE IN ULCERATIVE COLITIS. (Eng.) Martin, L. W.; LeCoultre, C.; Schubert, W. K. (Coll. Medicine, Univ. Cincinnati, Cincinnati, OH). *Ann. Surg.* 186(4):477-480; 1977.

A technique for preserving rectal continence in patients undergoing total colectomy for chronic ulcerative colitis is described, and its results in 17 patients are presented. Intensive medical management, total parenteral alimentation, steroid therapy, establishment of a preliminary diverting

ileostomy with subtotal colectomy, or a combination of these measures are required to insure that the rectal mucosa is free of gross disease at the time of operation. At surgery, the rectal mucosa is removed, but all the anorectal musculature is preserved. Total colectomy is performed, and the terminal ileum is then placed inside the retained muscular wall of the rectum and anastomosed to the anus. Satisfactory results were obtained in 15 patients, and no patient died. Thirteen patients are completely continent, and the other two have proximal ileostomies that have not yet been closed. The two failures were both due to pelvic sepsis, emphasizing the need for thorough rectal irrigation at the time of operation. All patients had frequent, watery stools for several weeks following surgery, and as long as 6 or 12 months were required for adaptation. Only four patients still have diarrhea, but this is satisfactory for the stage after operation. Ten patients, including the two failures, developed postoperative complications. These included wound infections (5 patients) due to operative rectal perforation, bleeding from the superior hemorrhoidal artery (1 patient), small bowel obstruction due to adhesions (3 patients), and "cuff abscess" (3 patients). The latter was an abscess forming inside the rectal cuff between it and the wall of the ileum and in the absence of anastomotic leak. All three patients developed stricture requiring release or dilatation. The results in these patients suggest that it is possible to perform a total colectomy with mucosal proctectomy and preserve anorectal continence.

7726 THE PROGNOSIS OF CARCINOMA OF THE COLON AND RECTUM COMPLICATING ULCERATIVE COLITIS. (Eng.) Hughes, R. G.; Hall, T. J.; Block, G. E.; Levin, B.; Moossa, A. R. (Pritzker Sch. Medicine, Chicago, IL). *Surg. Gynecol. Obstet.* 146(1): 46-48; 1978.

To test the hypothesis that the prognosis of colonic carcinoma in association with ulcerative colitis is poor, the survival rates and the tumor spread in 29 patients with ulcerative colitis and colonic carcinoma were compared with those in matched controls with carcinoma but without colitis. There were a total of 33 tumors in the 29 patients with colitis. The 5-yr survival rate in the group with colitis was 55.1%, and that in the patients without colitis was 46.9%, which was not a statistically significant difference. The spread of tumor as measured by penetration of the intestinal wall and by adjacent nodal invasion for the two patient groups showed that 30.5% of the carcinomas in patients without colitis had the same degree of spread as did those in patients with colitis; 44% of the carcinomas in patients without colitis had a more extensive spread and 25.5% of the carcinomas in patients without colitis exhibited less invasion than did carcinomas in patients with colitis. Patients with colitis and colonic carcinoma did not have more extensive penetration of the intestinal wall or more frequent nodal invasion than did those with carcinoma without colitis. In fact, the tumors arising in previously normal intestine appeared to exhibit a tendency for a greater degree of spread than did those tumors arising from an inflamed intestine ($p<0.001$). Tumors in patients with ulcerative colitis exhibit no greater invasiveness and are associated with the same overall survival rate as those occurring in a population without colitis.

7727 SALT-LOSING DIARRHOEA IN IDIOPATHIC PROCTOCOLITIS. (Eng.) Caprilli, R.; Sopranzi, N.; Colaneri, O.; Levi Della Vida, M.; de Magistris, L. (Second Medical Clinic, Univ. Rome, Policlinico Umberto I, 00100 Rome, Italy). *Scand. J. Gastroenterol.* 13(3):331-335; 1978.

The fecal chloride, sodium, and potassium outputs were studied in 14 patients with active idiopathic proctocolitis to establish a relationship between fecal electrolyte output and acid-base balance data. Seven ileostomized patients and eight healthy subjects served as controls. Mean sodium output was significantly higher in both ileostomy patients ($p<0.05$) and in the patients with proctocolitis ($p<0.05$) than in the normal subjects. The mean chloride excretion was also significantly higher in both patient groups ($p<0.01$), and high chloride excretion was seen in all but two patients with proctocolitis. Potassium excretion was not significantly different in the controls and proctocolitis patients, but it was significantly lower than controls in the ileostomized patients ($p<0.001$). It appears that the colons of patients with proctocolitis have an impaired capacity to absorb chloride and sodium but retain the ability to secrete potassium. Intestinal sodium, chloride, and water loss may be regarded as a salt-losing diarrhea and may account for the metabolic alkalosis commonly found in proctocolitis.

7728 NONSPECIFIC CHRONIC INFLAMMATORY INTESTINAL DISEASES. (Ger.) Hubner, K. (Klinikum der Johann Wolfgang Goethe-Universitat, Theodor-Stern-Kai 7, 6000 Frankfurt am Main 70, W. Germany). *Therapiewoche* 27(38):6641-6650, *passim;* 1977.

7729 ULCERATIVE COLITIS. (Fre.) Beaudry, R. (Centre Hospitalier Universitaire, Sherbrooke, Quebec, Canada). *Rev. Fr. Gastroenterol.* (123):35-40; 1976.

7730 CLINICAL VARIANTS OF NONSPECIFIC ULCERATIVE COLITIS IN CHILDREN. (Rus.) Makhmudov, O. S. (2nd Dept. Childhood Infections, Central Asiatic Medical Inst. Pediatrics, USSR). *Pediatriia* (4):36-39; 1977.

7731 ULCERATIVE COLITIS: ITS INCIDENCE AND TREATMENT AT A CENTRAL HOSPITAL. (Nor.) Lorentsen, E. (Sentralsykehuset i Akershus, Medisinsk og Kirurgisk avdeling, Akershus, Norway). *Tidsskr. Nor. Laegeforen.* 93(22):1075-1078; 1977.

7732 CLINICAL PICTURE OF ULCERATIVE COLITIS. (Ger.) Rettberg, H. (Zentrum der Inneren Medizin der Universitat, Theodor-Stern-Kai 7, 6000 Frankfurt a. M., W. Germany). *Therapiewoche* 27 (38):6653-6660, *passim;* 1977.

7733 PSYCHOSOMATIC ASPECTS OF ULCERATIVE COLITIS AND CROHN'S DISEASE. (Ger.) Freyberger, H. (Medizinische Hochschule Hannover, Hannover, W. Germany). *Therapiewoche* 27(38):6675-6682, *passim;* 1977.

7734 PSYCHOPATHOLOGIC PROFILE OF A PATIENT WITH HEMORRHAGIC RECTOCOLITIS. (Fre.) Salas, H.; Maffioli, C.; Louvet, H. (C.H.U., Hopital Robert Debre, Rue Alexis Carrel, 51100 Reims, France). *Rev. Fr. Gastroenterol.* (131):37-45; 1977.

7735 CURRENT STATUS OF SURGICAL TREATMENT FOR ULCERATIVE COLITIS AND CROHN'S DISEASE OF THE LARGE BOWEL. (Eng.) Goligher, J. C. (General Infirmary, Leeds LS1 3EX, England). *Can. J. Surg.* 21(1):28-38; 1978.

7736 PICTURE OF NONSPECIFIC ULCERATIVE COLITIS IN HELMINTHIASIS. (Rus.) Karnaukhov, V. K. (E. I. Martsinovskii Inst. Medical Parasitology and Tropical Medicine, USSR Ministry Public Health, Moscow, USSR). *Klin. Med. (Mosk.)* 55(2): 58-61; 1977.

See also, 7469, 7495, 7673, 7965.

PANCREAS

7737 PERCUTANEOUS FINE NEEDLE ASPIRATION BIOPSY OF THE PANCREAS FOLLOWING ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY. (Eng.) Ho, C. S.; McLoughlin, M. J.; McHattie, J. D.; Tao, L. C. (Toronto General Hosp., Toronto, Ontario, Canada). *Radiology* 125(2):351-353; 1977.

Early experience in combining percutaneous fine needle aspiration biopsy with endoscopic retrograde cholangiopancreatography (ERCP) in the diagnosis of pancreatic cancer is reported. The combined procedures were performed in nine patients with suspected pancreatic malignancies. The ERCP diagnosis was carcinoma in eight of the nine patients and localized stenosis of the body of the pancreas in the ninth patient. Biopsy confirmed the diagnosis in seven of the eight patients with carcinoma and provided a diagnosis of pancreatitis in the ninth patient. ERCP is an accurate method for diagnosing pancreatic cancer, and fine needle aspiration biopsy can confirm this diagnosis safely and easily.

7738 ANNULAR PANCREAS: A NEW CLASSIFICATION AND CLINICAL OBSERVATIONS. (Eng.) Johnston, D. W. B. (Westminster Hosp., London, Ontario N6A 4S2, Canada). *Can. J. Surg.* 21(3):241-244; 1978.

Seven cases of annular pancreas are described in which the diagnosis was confirmed at autopsy or operation. Annular pancreas appears to comprise two distinct subtypes not previously recognized. In type 1 (extramural), the ring of pancreatic tissue lies on the muscular wall of the duodenum and is covered by a thin layer of peritoneum. A definite plane of cleavage may be established between the annulus and the duodenum. There is always a main duct that sweeps dorsally and to the right around the duodenum to empty into the common bile duct or into the main pancreatic duct. Type 1 is usually associated with a dilated duodenum or megalobulbus and produces symptoms of high intestinal obstruction. In type 2 (intramural), the pancreatic tissue lies buried in the wall of the duodenum; any attempt to dissect out the annulus results in opening the lumen of the duodenum. There is no main ductal system, but rather a network of small canaliculi. Type 2 is usually associated with duodenal ulceration, and the clinical symptoms are due to the ulcer rather than to the annulus. Surgical treatment of type 1 is most successful if a simple bypass procedure is carried out. Surgical treatment of type 2 is subtotal gastrectomy with or without vagotomy.

7739 PANCREATIC ASCITES: REPORT OF TWO CASES. (Eng.) Aitchison, J. M.; White, J. A. M. (Addington Hosp., Durban, South Africa). *S. Afr. Med. J.* 52(24):982-984; 1977.

Two cases of pancreatic ascites are reported in which endoscopic retrograde and operative pancreatography were used to demonstrate the source of leakage from the duct system. The first pa-

tient was an alcoholic 34-yr-old man with a pancreatic pseudocyst. At laparotomy, contrast material was injected into the pseudocyst and appeared to leak into the general peritoneal cavity through the gastroepiploic foramen. A large retention cyst was demonstrated in the head of the pancreas, but no communication with the pancreatic duct system was found. A Roux-en-Y pancreaticojejunostomy was employed to drain both the retention cyst and the pseudocyst. The second patient was a 37-yr-old woman with recurrent severe abdominal pain, vomiting, diarrhea, weight loss, and ascites. Endoscopic retrograde pancreatography showed gross distortion of the gastric antrum and pylorus but no intrinsic lesion of the stomach or duodenum. Cannulation of the pancreatic duct and injection of contrast material demonstrated a stricture of the distal main pancreatic duct and leakage of contrast material through a fistula at the stricture into the lesser sac. The distal pancreatic duct system appeared to be grossly distorted with an intrapancreatic abscess cavity. A preoperative diagnosis of pancreatitis of unknown etiology with ascites secondary to leakage from an obstructed duct system was made. At laparotomy, dense adhesions were found around the distal pancreas, which was distorted and fibrosed. An abscess cavity was found in relation to the tail of the pancreas. The exact site of leakage from the duct system could not be identified, but the transitional zone from normal to abnormal pancreatic tissue was immediately to the left of the portal vein. The patient is asymptomatic 1 yr following distal pancreatectomy and splenectomy.

7740 INDOMETHACIN-RESPONSIVE PANCREATIC CHOLERA. (Eng.) Jaffe, B. M.; Kopen, D. F.; DeSchryver-Kecskemeti, K.; Gingerich, R. L.; Greider, M. (Washington Univ. Sch. Medicine, 4960 Audubon Ave., St. Louis, MO 63110). *N. Engl. J. Med.* 297 (15):817-821; 1977.

The case of a patient with the Verner-Morrison syndrome whose symptoms rapidly abated after the institution of indomethacin therapy is presented. The patient, a 67-yr-old woman, had a 9-yr history of diarrhea. She noted a 7-kg weight loss and weakness during the 3 months before she was hospitalized. A 1-week trial of p.o. indomethacin (25 mg/8 hr) resulted in marked diminution of stool volume and frequency, with attainment of essentially normal bowel habits. At laparotomy, a well-circumscribed tumor of the tail of the pancreas was resected. The patient is asymptomatic 3 months after surgery and has not required indomethacin. The plasma prostaglandin E, prostaglandin F, vasoactive intestinal peptide (VIP), gastrin, and human pancreatic polypeptide (HPP) levels were 977, 39, 82, 44, and 631 pg/ml on admission; with indomethacin treatment, these levels were 311, 45, 48, 41, and 621 pg/ml, and the postoperative levels were 310, 76, 129, 41, and 377 pg/ml, resp. The levels in the tumor were 52.5, 2.3, 7.7, 0.3, and 830 ng/g, and the levels in the pancreas were 3.5, 7.6, 1.5, 0.5, and 11,370 ng/g, resp. These results show that VIP or HPP was not involved in the pathogenesis of this patient's symptoms; prostaglandin E was clearly implicated in this patient.

7741 RAPID DEVELOPMENT AND SPONTANEOUS REGRESSION OF PANCREATIC PSEUDOCYSTS DOCUMENTED BY ULTRASOUND. (Eng.) Sarti, D. A. (Univ. California at Los Angeles Center for the Health Sciences, Los Angeles, CA 90024). *Radiology* 125(3): 789-793; 1977.

Three cases of pancreatic pseudocyst were followed serially by ultrasound examination. In the first case, the development of a pancreatic pseudocyst was well-documented by serial ultrasound examinations. No pseudocyst was present 6 days prior to the documentation of a large cyst found following an acute episode of abdominal pain markedly different from any pain noted previously during the hospital admission. The episode was initially felt to be due to acute exacerbation of the patient's pancreatitis, but in retrospect it coincided with the development of the pseudocyst. The patient underwent surgery 24 days after the last normal ultrasound study was done and 18 days after the pseudocyst was first documented. The pseudocyst probably developed at the time of the acute episode. This case indicates that pseudocysts of a relatively large size can arise quite rapidly and that acute abdominal pain suspected of being an exacerbation of underlying pancreatitis may indicate impending pseudocyst development. The wall of this pseudocyst was found to be mature enough to anastomose to the jejunum at the time of surgery. The maximum length of time for this maturation to have occurred was 3.5 weeks, with a minimal possible time of less than 3 weeks. In the other two patients, the pseudocysts regressed spontaneously. Pancreatic abscess could not be ruled out in these cases, but the patients did not manifest severe leukocytosis or fever and received no antibiotic therapy. The ultrasound findings of pancreatic abscess usually show thicker, more irregular walls than those demonstrated in these patients. One patient had been scheduled for surgery until the ultrasound examination revealed a decrease in the size of the cyst. She was followed by ultrasound and treated medically with successful results. The other patient's pseudocyst gradually increased in size until it reached 4 cm. She subsequently developed an acute episode of abdominal pain and, after this, ultrasound no longer showed the pseudocyst. These cases illustrate that presently held convictions concerning the evolution and treatment of pancreatic pseudocysts must be reevaluated.

7742 NESIDIOBLASTOMA OF THE HEAD AND UNCINATE PROCESS OF THE PANCREAS. (Fre.) Pouyet, M.; Treboux, M.; Daubricourt, M.; Chollat, L. (Clinique Claude Bernard, 69600 Oullins, France). *Lyon Chir.* 73(2):148-150; 1977.

7743 NEONATAL SCREENING FOR CYSTIC FIBROSIS. (Ita.) Giunta, A.; Giovannini, M. (Clin-

ica Pediatrica I dell'Universita, Via Commenda 9, Milan, Italy). *Minerva Med.* 68(30):2123-2128; 1977.

7744 HYPERAMYLASEMIA WITH MACROAMYLASEMIA. (Hun.) Pataki, I. (Varosi Tanacs Korhaza, Kozponti Laboratorium, Szentes, Hungary). *Orv. Hetil.* 118(4):203-205; 1977.

7745 GASTROENTEROLOGIC ASPECTS OF MUCOVISCIDOSIS. (Fre.) Bury, F.; Eggermont, E. (Kinderziekenhuis Gasthuisberg, Katholieke Universiteit te Leuven, B-3000 Leuven, Belgium). *Pediatrie* 31(6):551-562; 1976.

7746 HEMORRHAGIC PANCREATIC NECROSIS IN EARLY CHILDHOOD. (Rus.) Bergina, I. A.; Soldatov, Iu. N. (Central Municipal Hosp., Roven'ka, Voroshilovgrad Oblast, USSR). *Khirurgiia (Mosk.)* (1):114-115; 1978.

7747 ANGIOGRAPHIC DIAGNOSIS OF HEMORRHAGE FROM A PANCREATIC PSEUDOCYST WITH VENOUS DRAINAGE. (Ger.) Trapp, P.; Bode, A. (Rontgenabteilung, AK. Wandsbeck, 2000 Hamburg 70, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(2):188-190; 1977.

7748 PANCREATIC PSEUDOCYST OF UNUSUAL LOCALIZATION. (Ger.) Otto, R.; Linder, E. (Rontgendiagnostisches Zentralinstitut, Universitat Zurich, Ramistrasse 100, CH-8091 Zurich, Switzerland). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 126(3):270-271; 1977.

7749 PERIPANCREATIC TUBERCULOSIS. (Fre.) Danne, O.; Mehaut, M.; Gouerou, H.; Cerf, M.; Gosset, F.; Debray, C. (Hopital Corvisart, 22, rue d'Aubilly, 08107 Charleville-Mezieres, France). *Sem. Hop. Paris* 53(11/12):703-706; 1977.

7750 VERNER-MORRISON'S SYNDROME. (Fre.) L'Esperance, G.; Lamoureux, C.; Giroux, Y. (Hopital Maisonneuve-Rosemont, 5415, boul. de l'Assomption, Montreal H1T 2M4, Quebec, Canada). *Union Med. Can.* 106(6):847-852; 1977.

See also, 7480, 7481, 7482, 7483, 7485, 7487, 7490, 7495, 7599, 7655, 7751, 7756, 7758, 7761, 7765, 7766, 7767, 7769, 7774, 7775, 7779, 7804, 7810, 7869, 7892, 7912, 7936.

PANCREAS

Pancreatitis

7751 AMYLASE THERMOLABILITY: ITS APPLICATION IN THE DIAGNOSIS OF ACUTE PANCREATITIS AND PANCREATIC PSEUDOCYSTS. (Eng.) Donaldson, L. A.; Brodie, M. J.; Joffe, S. N.; McIntosh, W. (E. J. Meyer Memorial Hosp., Buffalo, NY). *Surg. Forum* 28:444-445; 1977.

The usefulness of a thermolability technique for the accurate identification of serum amylase isoenzymes was investigated using sera from 22 patients with acute pancreatitis, 12 with acute parotitis, 14 with resolved pancreatitis, 9 with pancreatic pseudocyst, and 23 healthy controls. The percentage thermolabile amylase in each of these groups was 84 ± 13, 83 ± 12, 55 ± 10, 79 ± 13, and 44 ± 10, resp. These findings are consistent with an outpouring of salivary or pancreatic (i.e., heat-labile) amylase during inflammatory processes of the parotid glands or pancreas. As pancreatitis resolves, the normal level of thermolability (44 ± 10%) is again approached (55 ± 10%). Amylase thermolability is a quick and simple test that appears to increase the clinical application of the serum amylase level as a diagnostic tool in acute pancreatitis and pancreatic pseudocyst.

7752 DEATH FROM ACUTE PANCREATITIS: M.R.C. MULTICENTRE TRIAL OF GLUCAGON AND APROTININ. (Eng.) Welbourn, R. B.; Armitage, P.; Gilmore, O. J. A.; MacKay, C.; Trapnell, J. E.; Williamson, R. C. N.; *et al.* (Northwick Park Hosp., Watford Rd., Harrow, Middlesex, HA1 3UJ, England). *Lancet* 2(8039):632-635; 1977.

The influence of glucagon and aprotinin on the death rate from acute pancreatitis was studied in a randomized double-blind multicenter trial, which included 257 patients with a serum amylase level of at least 2,000 IU/l. The drug doses were: aprotinin, 500,000 U i.v. immediately followed by 300,000 U by i.v. infusion 6-hourly for 5 days and glucagon, 2 mg, i.v., immediately followed by 2 mg by i.v. infusion 6-hourly for 5 days. The death rate in the whole group was 11%. The differences between treatment groups were not statistically significant ($\chi^2=0.26$, $0.8<p<0.9$). Neither the etiological factors in the development of pancreatitis, nor the age or sex of the patient influenced the death rate significantly. Active treatment did not improve the chances of survival in patients in whom there was no history of a previous attack, and active treatment failed to influence the death rate in those patients who did not

have surgical treatment. The results indicate that, in the doses used, neither drug diminishes the risk of death in acute pancreatitis.

7753 LIPID ALTERATIONS IN ACUTE PANCREATITIS. (Eng.) Lazaro, E. J.; Bose, A. K.; Spraggins, R.; Dispenziere, B. R. (Martland Hosp., 65 Bergen St., Newark, NJ 97107). *Can. J. Surg.* 21(3): 270-271; 1978.

Important and previously unreported changes in carbon-16 and carbon-18 fatty acids of the blood in acute experimental pancreatitis in dogs and acute pancreatitis in humans are described. Acute pancreatitis was induced by the Pfeffer closed duodenal loop in 7 dogs; in the control animals, conditions that clinically resemble acute pancreatitis were induced: celiotomy (3 dogs), bilateral ureteral ligation (3), duodenal perforation (3), strangulation obstruction (4), strangulation obstruction with manipulation of the common bile duct (3), and hemipancreatectomy (2). Venous blood samples were obtained at 0, 3, 6, and 9 hr after each operation, and the animals were sacrificed for autopsy. Mass spectroscopy and gas chromatography were used to study the blood fatty acid profile in these animals and in three patients with acute pancreatitis and five with nonpancreatic acute abdominal disease (controls). A marked increase in the concentration of fatty acids with mono-unsaturation in both carbon-16 and carbon-18 chains and with di-unsaturation in the carbon-18 chains was observed. The amount of carbon-16 unsaturated acids increased from about 15% of the saturated carbon-16 acids in controls to up to 20 times that amount in acute pancreatitis.

7754 ACUTE PANCREATITIS AND SEROLOGICAL EVIDENCE OF INFECTION WITH Mycoplasma pneumoniae. (Eng.) Freeman, R.; McMahon, M. J. (General Infirmary, Leeds, England). *Gut* 19(5):367-370; 1978.

Paired serum samples from 27 patients with acute pancreatitis were examined for evidence of infection with *Mycoplasma pneumoniae*, *Coxiella burneti*, influenza viruses types A and B, adenovirus, chlamydia subgroup B, mumps virus, and Coxsackie viruses group B, types 1-6 because previous studies have suggested that some cases of pancreatitis are associated with viral agents or with *M. pneumoniae*. Evidence of infection with Coxsackie viruses group B was found in three patients and of infection with *M. pneumoniae* in nine patients. No evidence of *M. pneumoniae* was found in any of the three patients with evidence of Coxsackie virus infection. The results support those previously reported in which a substantial proportion of patients with acute pancreatitis have serological evidence of *Mycoplasma* infection, but this link must be further investigated.

7755 RESPIRATORY COMPLICATIONS OF ACUTE PANCREATITIS. (Ger.) Baumann, C.; Akovbiantz, A.; Danczkay, Z.; Heinzelmann, F. (Kantonsspital, Ramistrasse 100, CH-8091 Zurich, Switzerland). *Helv. Chir. Acta* 44(4):509-513; 1977.

Severe respiratory complications were seen in 12 patients with acute hemorrhagic pancreatitis. Pancreatitis was due to lithiasis in four patients, to alcoholism in three, and the etiology was not ascertained in one. Four patients had postoperative pancreatitis: one after cholecystectomy, two after surgery on the common bile duct, and another after total gastrectomy. Most blood gas parameters and radiological changes of the thorax became pathological within the first 3 days of pancreatitis. Despite intensive care, 11 patients died, including those with postoperative pancreatitis. The findings indicate the importance of the detection of early hypoxia, which should be treated as soon as possible by sufficient oxygenation. If the arterial pO_2 does not improve, endotracheal intubation should be performed without undue delay.

7756 ATYPICAL PANCREATIC PSEUDOCYSTS. (Eng.) Oleszchuk-Raszke, K.; Domanski, Z.; Niezabitowski, K. (Pomeranian Medical Acad. in Szczecin, Szczecin, Poland). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 128(4):464-468; 1978.

Three cases of atypical pancreatic pseudocyst, occurring in the course of chronic pancreatitis are presented. The cysts, formed by means of fistulization along the lienorenal ligament, were diagnosed on the basis of arteriography and confirmed surgically. In case I, splenomegaly was present, and selective celiac and superior mesenteric arteriography showed an avascular mass (15 x 8 cm) in the external part of the spleen. The removed intrasplenic pseudocyst was filled with yielded fluid (diastase determination, 8,888 Wohlgemuth's U; lipase determination, 0.6 U/ml). In case II, a palpable mass in the left upper quadrant with posterior displacement of the stomach was shown by selective splenic arteriography to be an avascular mass 8 cm in diameter. Indirect splenoportography showed splenic vein obstruction, one of the first symptoms of pancreatic pseudocyst in the hilus of the spleen. The cyst with the distal part of the pancreas and the spleen were resected. In case III, a palpable mass developed in the left upper quadrant 4 months after chronic pancreatitis and obstruction of the splenic vein had been diagnosed. During arteriography, there appeared a regular, oval blush (7 x 9 cm), characteristic of bleeding into the cyst, in the region of the tail of the pancreas. The vascular blush increased in intensity and persisted 20 min. The authors conclude that the possibility of an atypical pancreatic pseudocyst should be considered in all cases of chronic pancreatitis. Radiological diagnosis of such a cyst is possible by means of selective celiac, splenic, and superior mesenteric arteriography, and early diagnosis is vital to a successful outcome.

7757 THE PANCREAS AND IMMUNOGLOBULINS. II. IMMUNOGLOBULIN LEVELS IN THE PANCREATIC

SECRETIONS OF PATIENTS WITH CHRONIC PANCREATITIS. (Eng.) Soto, J.; Aufses, A. H., Jr.; Dreiling, D. A. (Mount Sinai Sch. Medicine, City Univ. New York, 100th St. and Fifth Ave., New York, NY 10029 *Am. J. Gastroenterol.* 67(6):561-564; 1977.

To determine whether immunologic participation in chronic pancreatitis might explain the persistence and progressive nature of the disease, the secretory patterns of immunoglobulins in 15 patients with chronic pancreatitis were compared with those of patients without pancreatic disease. The mean IgG, IgA, and IgM levels in the patients were 28.5 ± 24.8 mg/dl, 17.5 ± 11.4 mg/dl, and 1.8 ± 1.1 mg/dl, resp. These levels were not significantly different from those in the patients without pancreatic disease (21.44 ± 16, 7.20 ± 7.0, and 1.5 ± 0.97 mg/dl, resp.). However, in patients who stopped drinking but nevertheless went on to develop chronic pancreatitis, higher than normal pancreatic IgG and IgA levels were found, thereby implying an immunologic mechanism as the cause of progressive pancreatic abnormality.

7758 PANCREATITIS AND PANCREATIC CARCINOMA, DIAGNOSED BY PEROPERATIVE FINE NEEDLE ASPIRATION BIOPSY. (Eng.) Hastrup, J.; Thommesen, P.; Frederiksen, P. (Municipal Hosp., Aarhus, Denmark). *Acta Cytol.* 21(6):731-734; 1978.

The cytologic pattern was evaluated in 37 benign and malignant pancreatic lesions in a series of fine needle aspiration biopsies. Malignant cells were correctly identified in all 19 cases of cancer except 2 highly differentiated adenocarcinomas; the malignant cells identified came from 17 adenocarcinomas, 1 fibrosarcoma, and 1 lymphoma. Since inflammatory cells, debris, and atypical cells were found in both the benign (i.e., pancreatitis) and the malignant tissue, the cytodiagnosis of pancreatitis was not reliable.

7759 EVALUATION OF GLUCAGON AS TREATMENT FOR ALCOHOL-RELATED PANCREATITIS [Abstract]. (Eng.) Olazabal, A.; Fuller, R. K. (Cleveland Veterans Admin. Hosp., Cleveland, OH). *Gastroenterology* 72(5, Part 2):1109; 1977.

7760 CONSIDERATIONS ON A STATISTICAL SURVEY OF 104 SURGICAL PROCEDURES PERFORMED OVER A 10 YEAR PERIOD TO MANAGE CHRONIC PANCREATITIS. (Eng.) Doutre, L. P.; Perissat, J. (Clinique Chirurgicale Hospitalo-Universitaire, Bordeaux, France). *Chir. Gastroenterol.* 11(1):141-145; 1977.

7761 ACUTE PANCREATITIS OCCURRING IN GASTRIC ABERRANT PANCREATIC TISSUE. (Eng.) Green, P. H. R.; Barratt, P. J.; Percy, J. P.; Cumberland, V. H.; Middleton, W. R. J. (Royal North Shore Hosp. of Sydney, St. Leonards, New South Wales 2065, Australia). *Am. J. Dig. Dis.* 22(8):734-740; 1977.

7762 DRUG-INDUCED ACUTE PANCREATITIS. (Eng.) Nakashima, Y.; Howard, J. M. (Medical Coll. of Ohio, Toledo, OH). *Surg. Gynecol. Obstet.* 145(1):105-109; 1977.

7763 PANCREATITIS IN PREGNANCY. (Eng.) Bolen, J. W.; LeGrand, L. R. (199 Hospital Drive, Galax, VA 24333). *Va. Med. Mon.* 104(4):237, 239; 1977.

7764 PURE PANCREATIC JUICE RESPONSE TO SECRETIN IN NORMAL SUBJECTS AND CHRONIC PANCREATITIS [Abstract]. (Eng.) Cotton, P. B.; Denyer, M. E. (Middlesex Hosp., London W. 1, England). *Gastroenterology* 72(5, Part 2):1041; 1977.

7765 ELEVATED LUMINAL ENTEROPEPTIDASE ACTIVITY IN PATIENTS WITH PANCREATITIS OR CANCER OF THE PANCREAS [Abstract]. (Eng.) Rinderknecht, H.; Nagaraja, M.; Adham, N. F. (Veterans Admin. Hosp., Sepulveda, CA). *Gastroenterology* 72(5, Part 2):1164; 1977.

7766 THE ULTRASONIC FEATURES AND EVOLUTION OF PANCREATIC PSEUDOCYSTS [Abstract]. (Eng.) Palasciano, G.; Pietri, H.; Aimino, R.; Gaeta, L.; Sahel, J.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009 Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1):76; 1977.

7767 ECHOGRAPHIC AND PANCREATOGRAPHIC FEATURES OF PANCREATIC CYSTS [Abstract]. (Eng.) Sahel, J.; Pietri, H.; Palasciano, G.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009 Marseille, France). *Ir. J. Med. Sci.* 146 (Suppl. 1):26; 1977.

7768 THE VALUE OF ECHOGRAPHY IN THE DIAGNOSIS OF ACUTE PANCREATITIS AND ITS SHORT AND LONG-TERM SEQUELS [Abstract]. (Eng.) Pietri, H.; Palasciano, G.; Aimino, R.; Silvestri, N.; Gaeta, L.; Bianchini, A.; Serafino, X. (Institut J. Paoli-I, Calmettees, 232 Bd e Sainte-Marguerite, Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1): 25; 1977.

7769 RESPECTIVE VALUE OF ULTRASONOGRAPHY AND ERCP IN ACUTE PANCREATITIS [Abstract]. (Eng.) Sahel, J.; Pietri, H.; Palasciano, G.; Silvestri, N.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009 Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1):25; 1977.

7770 PANCREATIC AND SALIVARY AMYLASE/CREATININE CLEARANCE RATIOS IN NORMAL SUBJECTS AND IN PATIENTS WITH CHRONIC RELAPSING PANCREATITIS [Abstract]. (Eng.) Hegarty, J. E.; O'Donnell, M. D.; McGeeney, K. F.; FitzGerald, O. (St. Vincent's Hosp., Dublin 4, Ireland). *Ir. J. Med. Sci.* 146(Suppl. 1): 28; 1977.

PANCREAS

7771 EVALUATION BY MEANS OF ERCP OF SURGICAL RESULTS IN CHRONIC PANCREATITIS (CP) [Abstract]. (Eng.) Sahel, J.; Sarles, J. C.; Sarles, H. (Unite 31 INSERM, 46 chemin de la Gaye, 13009, Marseille, France). *Ir. J. Med. Sci.* 146(Suppl. 1): 36-37; 1977.

7772 SPLANCHNICECTOMY IN CHRONIC PANCREATITIS [Abstract]. (Eng.) Hureau, J.; Germain, M.; Avci, C.; Jost, J. L.; Roux, M. (Hopital de Vaugirard 389, rue de Vaugirard, 75015 Paris, France). *Ir. J. Med. Sci.* 146(Suppl. 1):41; 1977.

7773 RESULTS OF RESECTIONS FOR CHRONIC PANCREATITIS [Abstract]. (Eng.) Herzog, K. H. (Surgical Clinic, W.-Pieck-Univ., Rostock, E. Germany). *Ir. J. Med. Sci.* 146(Suppl. 1):49; 1977.

7774 PANCREAS DIVISUM. A SIGNIFICANTLY HIGHER INCIDENCE IN CHRONIC PANCREATITIS [Abstract]? (Eng.) Kruse, A. (Aarhus Kommunehospital, DK-8000 Aarhus C, Denmark). *Scand. J. Gastroenterol.* 12(Suppl. 45):52; 1977.

7775 PARTIAL OR TOTAL RESECTION IN TREATMENT OF CHRONIC PANCREATITIS [Abstract]. (Eng./Ger.) Botticher, R.; Muhe, E. (Chirurgische Klinik der Univ., Maximiliansplatz, D-8520 Erlangen, W. Germany). *Langenbecks Arch. Chir.* 345:584-585; 1977.

7776 ANASTOMOSING AND RESECTING OPERATIONS FOR CHRONIC RECURRENT PANCREATITIS: COMPARATIVE RESULTS [Abstract]. (Eng./Ger.) Scholze, H. (Chirurgische Klinik, rechts der Isar der TU, Ismaninger Str. 22, D-8000 Munchen 80, W. Germany). *Langenbecks Arch. Chir.* 345:584; 1977.

7777 PHENFORMIN AND PANCREATITIS [Letter to Editor]. (Eng.) Ryan, L. M.; Hankwitz, P.; Banasiak, M. (Medical Coll. Wisconsin, Milwaukee, WI 53226). *Ann. Intern. Med.* 87(6):796; 1977.

7778 INCIDENCE AND MORTALITY OF ACUTE PANCREATITIS [Letter to Editor]. (Eng.) Graham, D. F. (Broxburn, W. Lothian, Scotland). *Br. Med. J.* 2(6102):1603; 1977.

7779 LACTOFERRIN RADIOIMMUNOASSAY: LEVELS IN PURE PANCREATIC JUICE [Abstract]. (Eng.) Fedail, S. S.; Harvey, R. F.; Salmon, P. R.; Read, A. E. (Royal Bristol Infirmary, Bristol, England). *Gut* 18(11):A980; 1977.

7780 ENDOSCOPIC RETROGRADE PANCREATOGRAPHY (ERCP) IN CHRONIC ALCOHOLISM [Abstract]. (Eng.) Krarup, T.; Strandgaard, L.; Elsborg, L.; Reinicke, V. (Copenhagen County Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 12(Suppl. 45): 48; 1977.

See also, 7375, 7377, 7453, 7458, 7466, 7484, 7872, 7892, 7922, 7935.

LIVER AND BILIARY TRACT

7781 HEPATIC SINUS CELLS (ENDOTHELIAL CELLS, KUPFFER CELLS, ITO CELLS, PIT CELLS WITH ENDOCRINE GRANULES): FUNCTIONAL CHANGES AND LESIONS IN HUMAN LIVER DISORDERS. (Fre.) Albot, G.; Parturier-Albot, M.; Reynes, P. (8, rue des Saints-Peres, 75007 Paris, France). *Ann. Gastroenterol. Hepatol.* 14(1):5-34; 1978.

An extensive review is presented of the role of the four cells found in the hepatic sinuses, but particularly the Kupffer cell, which is part of the mononucleated phagocyte system (reticuloendothelial system). The changes in the hepatic sinus cells observed in the human in the course of liver pathology such as excretory cholestasis, toxic hepatitis, viral hepatitis, and granulomatous hepatitis are described from their histological and functional aspects. The Kupffer cells have a dual function: (1) phagocytosis and intracellular digestion similar to that of other phagocytes and (2) specific permeability, permitting transfer to the blood of substances metabolized in the hepatocytes.

7782 KIDNEY FAILURE DURING LIVER DISEASE. THE SIGNIFICANCE OF ENDOTOXINS. (Ger.) Wilkinson, S. P. (King's Coll. Hosp. and Medical Sch., Denmark Hill, London, SE 5, England). *Z. Gastroenterol.* 15(11):663-669; 1977.

The pathological mechanism of acute renal failure occurring during liver cirrhosis, fulminant hepatic failure due to acute viral hepatitis, halothane hypersensitivity, or overdose of paracetamol is discussed. Acute renal failure may occur with acute tubular necrosis or without it (functional renal

failure). The underlying pathophysiological change is an intense renal and intrarenal vasoconstriction. Evidence is presented that the vasoconstriction is due to systemic endotoxemia resulting from the failure of the liver to filter out endotoxins absorbed from the gastrointestinal tract. Endotoxins cause renal vasoconstriction and glomerular and peritubular fibrin deposition by activating intravasal coagulation. Acute tubular necrosis is interpreted as the consequence of fibrin deposition; necrosis of the renal cortex may also occur in serious cases. In case of pronounced vasoconstriction, acute tubular necrosis may also be the consequence of tissue anoxia. Acute renal failure seen in obstructive jaundice has also been related to endotoxemia, but, in contrast to cirrhosis and fulminant hepatic failure, this is usually due to an associated gram-negative infection, and the renal failure almost invariably has the features of acute tubular necrosis. The findings indicate that the nature of the renal failure depends on the balance between vasoconstriction and fibrin deposition, which may be profoundly altered by the underlying liver disease.

7783 HAPTOGLOBIN IN VARIOUS DISEASES: A REVIEW. (Ger.) Heilmann, E. (Medizinische Poliklinik, Westfalische Wilhelms-Universitat, Westring 3, D-44 Munster [Westf.], W. Germany). *Folia Haematol. (Leipz.)* 104(5):608-618; 1977.

Studies and observations on changes in the serum haptoglobin (Hp) levels in various diseases are reviewed. Increased serum Hp levels were found in rheumatoid arthritis, aplastic anemia, cholestasis, nonmalignant peptic ulcer, ulcerative colitis, diabetic angiopathy, and during estrogen therapy and the use of oral contraceptives. Hemolysis, megaloblastic anemia, and hepatocellular diseases are accompanied by reduced serum Hp levels. The serum Hp level is usually reduced in acute and chronic lesions of the liver parenchyma; there seems to be a correlation between the extent of the lesion and the serum Hp level. These findings suggest that a disorder in protein synthesis is the cause of reduced Hp levels in inflammatory hepatic processes. The determination of the serum Hp levels is relevant for the diagnosis of liver cirrhosis; postnecrotic and portal cirrhoses are usually accompanied by subnormal Hp levels, while normal values are found in biliary cirrhosis. Especially low Hp levels are found in cirrhosis associated with splenomegaly. The Hp level is lowest in cryptogenic portal cirrhosis, juvenile cirrhosis, and hemochromatosis. The serum Hp level is usually normal in secondary liver carcinoma.

7784 ULTRASTRUCTURAL MORPHOMETRIC INVESTIGATIONS ON LIVER BIOPSIES. THE INFLUENCE OF ORAL CONTRACEPTIVES ON THE HUMAN LIVER. (Ger.) Stahl, K.; Themann, H.; Verhagen, A. (Lehrstuhl fur Medizinische Cytobiologie, Westring 3, D-4400 Munster, W. Germany). *Arch. Gynaekol.* 223(3):205-211; 1977.

Liver biopsy specimens from 12 healthy women who had been using oral contraceptives (lynestrenol or ethinyl estradiol) for 2-76 months were investigated morphometrically according to Weibel's method. The stereological data obtained were compared with standard values for normal human liver biopsies. The volume density of the lysosomes per ml of hepatocytes showed a pronounced, significant ($p<0.001$) increase in the biopsy specimens from the probands. The cytoplasm was slightly enlarged, and the size of the cell nuclei reduced. The other parameters showed no substantial ultrastructural alterations of the liver following the use of hormonal contraceptives. Functional alteration cannot, however, be excluded.

7785 BENIGN HEPATIC LESIONS IN WOMEN TAKING ORAL CONTRACEPTIVES. (Eng.) Davis, T. J.; Berk, R. N. (Presbyterian Hosp., 8200 Walnut Hill Lane, Dallas, TX 75231). *Gastrointest. Radiol.* 2(3):213-219; 1977.

Four cases of benign hepatic cell lesions in young women taking oral contraceptives are reported. The patients ranged in age from 23 to 41 yr and had taken oral contraceptives for 4 to 7 yr. In the first patient, focal nodular hyperplasia was discovered at exploratory laparotomy after a midepigastric abdominal mass was palpated during a routine physical examination. In another patient, focal nodular hyperplasia was found incidentally at pelvic exploration for a suspected ovarian tumor. The other two patients presented with abdominal pain and intraperitoneal bleeding; both patients had hepatic adenomas, and one also had focal nodular hyperplasia and a retention cyst. Angiography and radionuclide scanning aided in localizing and estimating the size of the liver lesions.

7786 IATROGENIC LIVER ABSCESSES: A COMPLICATION OF HEPATIC ARTERY LIGATION FOR TUMOR. (Eng.) Jochimsen, P. R.; Zike, W. L.; Shirazi, S. S.; Pearlman, N. W. (Univ. Hosp., Iowa City, IA 52242). *Arch. Surg.* 113(2):141-144; 1978.

A review of six case histories of patients who developed intrahepatic pyogenic abscesses following therapeutic hepatic artery ligation and placement of intra-arterial catheters for infusion chemotherapy directed at primary or metastatic liver tumors was undertaken to assess the magnitude of the problem, produce future earlier recognition of the complication, and assess the adequacy of abscess management. In five of the six affected patients, the common hepatic artery was ligated just proximal to the gastroduodenal artery, which was used for the retrograde placement of the infusion catheter into the hepatic artery. In one patient in whom the left and right hepatic arteries had separate points of origin, each vessel was cannulated and ligated. The symptoms of fever, pain, and prostration are similar to those reported for hepatic abscesses of other etiologies. Laboratory confirmation of leukocytosis and impaired hepatic function may be obscured by myelosuppressive chemotherapeutic agents and an already severely damaged liver. Abnormal gas

patterns in the area of the liver developed in all the patients and were often confirmed by ultrasound or by computed axial tomography. Both the reduced hepatic blood supply and the development of large amounts of nonviable tumor (the goal of the procedure) that act as a nidus for bacterial colonization predispose to the development of abscesses in these patients. It appears that cryptogenic abscesses with obscure etiologies arise from secondarily infected hepatic infarcts seeded by colon organisms via the portal vein. Antibiotic therapy alone is rarely effective, simple aspiration is not sufficient, and less-than-adequate surgical exploration results in multiple procedures. Treatment should always be surgical debridement and drainage. Abscesses tended to develop later than expected, usually after antibiotic prophylaxis was withdrawn, implying a causal relationship. Four of the six patients died (average survival from ligation, 348 days), and two are alive 378 and 102 days, resp., since ligation. These figures compare well with the average survival of 337 days from ligation among the 45/57 patients who died without developing abscesses and the 12/57 without abscesses who remain alive an average of 2 yr.

7787 INTRAHEPATIC PIGMENT AND CRYSTAL FORMS IN PATIENTS WITH CEREBROTENDINOUS XANTHOMATOSIS (CTX). (Eng.) Salen, G.; Zaki, G.; Sabesin, S.; Boehme, D.; Shefer, S.; Mosbach, E. H. (East Orange Veterans Admin. Hosp., Tremont Ave., East Orange, NJ 07019). *Gastroenterology* 74(1):82-89; 1978.

Unique electron-dense bodies and crystal forms detected in the liver cells of two patients with cerebrotendinous xanthomatosis (CTX) are described. Histologic examination of plastic-embedded sections stained with toluidine blue demonstrated the presence of excessive dark pigment granules in the hepatocytes. Ultrastructural examination showed that this pigment was distributed widely throughout the hepatocytes and Kupffer cells and was in two forms. Amorphous electron-dense material was seen enveloped by the smooth endoplasmic reticulum or was found free-floating in the cytosol. Crystals were also found in the cytosol and resembled rhomboid-shaped bodies. The pigment resembles lipofuscin, especially in its osmiophilic stainability; yet because of its profuse and excessive deposition within the liver cells, it may be related to the basic biochemical defect in bile acid synthesis in CTX. The authors propose that the accumulation of such material may indicate the presence of nonmetabolizable bile alcohols resulting from a defect in bile acid synthesis.

7788 TRYPTOPHAN AND HEPATIC COMA. (Eng.) Ono, J.; Hutson, D. G.; Dombro, R. S.; Levi, J. U.; Livingstone, A.; Zeppa, R. (Sch. Medicine, 1208-1 Usuki-Cho, Kagoshima City, 890, Kagoshima, Japan). *Gastroenterology* 74(2, Part 1):196-200; 1978.

To clarify the involvement of tryptophan (Trp) in the pathogenesis of hepatic coma, an investigation was carried out to elucidate the plasma factors responsible for the increased levels of Trp found in the cerebrospinal fluid (CSF) of patients in hepatic coma. Factors believed to be involved in the transport of Trp into the central nervous system were measured in 10 patients with liver cirrhosis and in stage III or IV hepatic coma, 10 patients with stable cirrhosis, and 10 healthy controls. Neither plasma total nor free Trp levels were significantly altered in cirrhotic patients compared with controls, but in hepatic coma patients, the plasma free Trp level was significantly elevated (1.94 ± 0.23 μmol/dl) and the plasma total Trp level decreased (2.8 ± 0.3 μmol/dl) compared with control levels (0.43 ± 0.03 and 4.7 ± 0.5 μmol/dl, resp., $p<0.001$ and $p<0.01$, resp.). The CSF levels of Trp were significantly greater than normal in both patient groups ($p<0.001$), but were more elevated in the coma patients than in the cirrhotics ($p<0.05$). Plasma free fatty acid levels were significantly elevated in both cirrhotics ($p<0.05$) and in hepatic coma patients ($p<0.001$) compared with controls, but were more elevated in the coma patients than in the cirrhotics ($p<0.001$). Serum albumin concentrations were significantly decreased in cirrhotics ($p<0.02$) but more significantly decreased in hepatic coma patients ($p<0.001$). The serum total bilirubin level was moderately elevated in cirrhotics (1.0-1.9 mg/dl) compared with controls (0.41-0.94 mg/dl) but markedly elevated in hepatic coma patients (1.5-67 mg/dl). Plasma branched chain amino acid (BCAA) levels were significantly lower than normal in both cirrhotics and hepatic coma patients ($p<0.001$-$p<0.05$); isoleucine and leucine levels were also significantly lower in the hepatic coma patients than in the cirrhotics ($p<0.01$ and $p<0.05$, resp.). No significant differences were found in the concentrations of CSF BCAA in any of the groups compared. Among the aromatic amino acids, plasma phenylalanine, tyrosine (Tyr), and methionine (Met) were significantly increased in hepatic coma patients ($p<0.01$, $p<0.001$, and $p<0.001$, resp.), but only Tyr and Met were significantly increased in cirrhosis without coma ($p<0.01$ and $p<0.001$, resp.). The CSF levels of these three amino acids were significantly higher in both patient groups ($p<0.001$-$p<0.05$), but no significant differences between the two groups were observed. The data demonstrate that, whereas the elevated CSF Trp levels in cirrhotics versus controls may be attributable to decreased plasma BCAA levels, the elevated CSF Trp levels in hepatic coma patients compared with stable cirrhotic patients may be attributable to increased plasma free Trp concentrations.

7789 SYMPTOMATIC NONPARASITIC LIVER CYSTS. (Eng.) Hadad, A. R.; Westbrook, K. C.; Graham, G. G.; Morris, W. D.; Campbell, G. S. (Univ. Arkansas for Medical Sciences, 4301 W. Markham, Little Rock, AR 72201). *Am. J. Surg.* 134:739-744; 1977.

The cases of four women with symptomatic nonparasitic liver cysts are presented. The patients ranged in age from 49 to 80 yr. All presented with

an abdominal mass. Radiologic studies demonstrated displacement of the intraabdominal viscera by extrinsic pressure in all cases, and a ^{99m}Tc liver scan revealed filling defects in three patients. The ultrasound examination performed in three cases suggested a cystic mass, although the mass was initially thought to be a pancreatic pseudocyst before operation in one patient. Surgical exploration revealed multiple cysts in three cases and a solitary cyst in the fourth. The largest cysts were marsupialized, and the smaller ones were drained. Microscopic section of the cyst walls revealed fibrous tissue, hepatocytes, aberrant bile ducts, and a lining of cuboidal and columnar cells. The results in these patients and in others reported in the literature suggest that the diagnosis of liver cysts can be established with routine and special radiologic studies; that laparotomy is indicated for patients with symptoms or uncertain diagnosis; that surgical management should be guided by cyst size, location, and content; and that definitive surgical treatment is indicated only for cysts larger than 10 cm.

7790 CONGENITAL CYSTIC DILATATION OF THE INTRAHEPATIC BILE DUCTS (CAROLI'S DISEASE). (Eng.) In der Maur, G. A. P.; Zuidema, B. J. J.; Duursma, S. A.; Blom, W. F. (Dept. Diagnostic Radiology, St. Geertruiden Ziekenhuis, Fesevurstraat 7, Deventer, Netherlands). *Radiol. Clin.* 47(3): 182-189; 1978.

The clinical features of Caroli's disease (segmentally dilatated intrahepatic bile ducts) are described with reference to an affected 32-yr-old woman. The principal characteristics of the disease are segmental saccular or cystic dilatations of the intrahepatic bile ducts; predisposition to lithiasis, cholangitis, and liver abscesses; and lack of involvement of the other bile ducts and an absence of liver cirrhosis and portal hypertension. The symptoms consist primarily of sometimes colicky pain in the right upper quadrant, and the disease is generally diagnosed on the basis of a preoperative cholangiogram. When Caroli's disease is suspected, echography can be a valuable diagnostic tool. The disease is usually diagnosed in men and women between 30 and 40 yr of age and is generally regarded as a grave condition because of its tendency to lead to serious complications (e.g., liver abscess, cholangitis, and sepsis). Its pathogenesis is obscure, but it is suspected that an embryonic developmental disorder in the wall of the bile ducts causes cysts via physiological periodic increases in pressure.

7791 UPTAKE OF ^{99m}Tc-PYROPHOSPHATE IN LIVER NECROSIS. (Eng.) Echevarria, R. A.; Bonanno, C.; Davis, D. K. (St. Petersburg General Hosp., St. Petersburg, FL 33710). *Clin. Nucl. Med.* 2(9):322-323; 1977.

The case of a patient in whom the liver was visualized on a routine bone scan performed with ^{99m}Tc-pyrophosphate is presented. The patient was a 77-yr-old diabetic man hospitalized for congestive heart failure. The bone scan was performed because the patient underwent resection of a rectal adenocarcinoma 2 yr previously. No skeletal metastases were demonstrable, but there was marked uptake of the radionuclide by the liver with an irregular central cold area. Forty-eight hours later, a ^{99m}Tc-sulfur colloid scan of the liver showed a similar liver image with a central defect of uptake and compensatory uptake of colloid by the vertebral and rib bone marrow. The patient died a week later, and at autopsy the liver showed a gross "nutmeg" appearance. There was a metastatic mass corresponding to the cold area of the scans. A few smaller metastases that had not been visualized were present. Severe centrilobular hemorrhagic necrosis was observed. The radionuclide is thought to have been taken up by the necrotic liver cells. The possibility that the necrotic liver may be consistently visualized by bone-seeking radionuclides deserves further exploration.

7792 HEPATIC TUMORS: POSSIBLE RELATIONSHIP TO USE OF ORAL CONTRACEPTIVES. (Eng.) Klatskin, G. (Dept. Medicine, Yale Univ., 333 Cedar St., New Haven, CT 06510). *Kurume Med. J.* 24(Suppl.):S1-S26; 1977.

The potential role of oral contraceptives in the pathogenesis of hepatic tumors was investigated in a survey of 105 cases reported in the literature since 1972, including 10 cases of malignant tumors and 95 cases of benign tumors (69 hepatic cell adenomas [HCA] and 26 cases of focal nodular hyperplasia [FNH]). While 53% of the patients had used oral contraceptives for more than 5 yr, 11% had used them for less than 1 yr. The estrogen in the contraceptive was mestranol in 87% of the cases and ethinyl estradiol in 13%. Except for the absence of cirrhosis, the clinical features of patients with malignant hepatic tumors associated with the use of oral contraceptives were similar to those that usually accompany such tumors. The benign tumors produced a wide variety of symptoms and many of the clinical and morphological features were significantly different in users of oral contraceptives compared with nonusers (138 cases of HCA; 234 cases of FNH). The presenting complaints, tumor size, and appearance for both HCA and FNH in contraceptive users and nonusers are summarized in detail. Functional, scintiscan, and arteriographic findings and the clinical course of the disease in contraceptive users are tabulated and discussed. A high survival rate (92%), remarkable tolerance to surgery, and a decrease in tumor size after discontinuation of oral contraceptive use were noted. The morphology of the tumors in contraceptive users is discussed at length and the possibility is suggested that the two types of tumors may be related in some cases. Evidence supporting a hormonal role in the pathogenesis of hepatic tumors and evidence suggesting that vascular changes in hepatic tumors reflect hormonal effects is presented. These facts may indicate that oral contraceptive use merely enhances the growth rate of small, otherwise unrecognized tumors. It is concluded that evidence implicating oral contraceptives

in the pathogenesis of hepatic tumors is as yet circumstantial.

7793 HEPATOCELLULAR CARCINOMA AND HEPATITIS B. (Eng.) Zuckerman, A. J. (London Sch. Hygiene Tropical Medicine, London WC1E 7HT, England). *Trans. R. Soc. Trop. Med. Hyg.* 71(6):459-461; 1977.

The relationship between hepatitis B (HB) and the pathogenesis of cirrhosis and primary hepatocellular carcinoma is reviewed briefly. The availability of specific laboratory tests for HB infection has demonstrated an excess prevalence of markers of active HB virus (HBV) infection in patients with primary liver cancer when compared with the general population; those markers are HB surface antigen (HBsAg) and its homologous antibody, HB core antigen (HBcAg) and its homologous antibody, and HBeAg. The cause and effect relationship is not clear: does the infectious agent drive the processes of macronodular cirrhosis and carcinoma or do these latter disease states predispose to greater susceptibility to HBV infection and the development of the carrier state? An early age of HBV infection such that the carrier state occurs most frequently in infants and children appears to be an important etiological factor in cirrhosis and carcinoma; it seems likely that persistent HBV infection occurs before the onset of chronic liver damage. Some progress is being made in demonstrating that HBV infection precedes the development of cancer, that tumor cells contain virus-specific molecules or antigens, that cancer cells can produce the virus, and that the virus can transform cells in culture or induce hepatocellular carcinomas in experimental animals. Much more work is required to elucidate the contributions of genetic, immunological, nutritional, and hormonal factors; mycotoxins; chemical carcinogens; other environmental factors; and HBV to hepatocellular carcinogenesis.

7794 HEPATOADENOMA AND FOCAL NODULAR HYPERPLASIA: PITFALLS IN RADIOCOLLOID IMAGING. (Eng.) Salvo, A. F.; Schiller, A.; Athanasoulis, C.; Galdabini, J.; McKusick, K. A. (Maine Medical Center, Portland, ME 04102). *Radiology* 125(2):451-455; 1977.

The cases of three patients with hepatoadenoma or focal nodular hyperplasia in whom radiocolloid imaging was used in the diagnosis are presented. The patients were women, ranging in age from 39 to 45 yr, and two had been taking oral contraceptives. The first patient was asymptomatic, but had a right upper quadrant abdominal mass, which was palpable on routine examination. A ^{99m}Tc-sulfur colloid liver scan demonstrated that the inferior margin of the right lobe of the liver, in a position corresponding to that of the mass, was indented. At laparotomy, the tumor was found to be a well-demarcated but nonencapsulated smooth round mass composed of cords of uniform cells closely resembling normal hepatocytes. The cells were arranged in irregular trabeculae from one to five cells thick and were separated by sinusoids lined by endothelium and Kupffer cells. No portal tracts or bile ducts were present; tumor cell trabeculae around irregularly spaced venous channels occasionally were surrounded by areas of fibrosis. The second patient's only symptom was hepatomegaly, discovered at routine physical examination. Abdominal angiography revealed a massively enlarged right lobe with a hypervascular mass. The ^{99m}Tc-sulfur colloid scan showed irregularly shaped areas of decreased activity involving half the right lobe and a portion of the left lobe. At surgery, an attempt was made to remove a large vascular tumor in the lower half of the right lobe, but dissection revealed extension into the left lobe. Needle biopsy confirmed the diagnosis of hepatoadenoma. Extensions of the tumor were found, with multiple projections into normal liver across the surgical planes of dissection. Copious bleeding from the resection margin could not be controlled, and the patient died during surgery. At autopsy, the tumor was found to be similar to that in the first patient, except for a slightly lobulated contour, a more pronounced increase in tumor cell glycogen content, and the presence of many randomly scattered necrotic foci. A liver mass was discovered in the third patient at hysterectomy. Postoperatively, a liver scan demonstrated a normal liver except for a slight increase in radioactivity in the central portion. At laparotomy, a diagnosis of focal nodular hyperplasia was made.

7795 CURRENT TREATMENT OF PRIMARY MALIGNANT HEPATOBLASTOMA IN CHILDHOOD (A SURVEY IN AUSTRIA). (Ger.) Sauer, H.; Kurz, R.; Haas, H.; Mutz, I. (Kinderchirurgie, Universitat Graz, Heinrichstrasse 31, A-8010 Graz, Austria). *Z. Kinderchir.* 22(3):313-323; 1977.

The diagnosis and treatment of hepatoblastoma in 11 children are described. The patients included 6 boys and 5 girls aged 5 days to 15 yr; two-thirds of the patients were under 2 yr. Palpable liver tumor was the common symptom and anemia was found in five cases, but the other laboratory findings were unremarkable. The tumors were diagnosed by angiography, liver scanning, and sonography. The alpha-1-fetoprotein level was abnormally high in five of seven investigated cases. The tumor was localized to the right lobe in five cases, to the left lobe in four and to both lobes in two. Embryonic hepatoblastoma was diagnosed in 10 cases and hepatocellular carcinoma in 1. Nine patients were in clinical stage II, and two were in stage III. Radical surgery was performed in 10 patients; it consisted of lobectomy or extended lobectomy in 9 and of segment resection in 1. Exploratory laparotomy was performed in two inoperable patients with bilateral involvement. Three patients also received postoperative radiotherapy. Six patients, including one irradiated patient, received postoperative chemotherapy with cyclophosphamide (CP) or vincristine (VCR, one case each), with the combination of VCR, CP, and actinomycin D (AD), with VCR + CP + adriamycin + 5-fluorouracil (5-FU) or with VCR + CP + 5-FU.

Three patients developed metastases; two had recurrences. Three patients died after 8 months to 5 yr; the others have been alive for 1 week to 15 yr (one of them has been alive with metastases for 9 months).

7796 INTRAHEPATIC HEMATOMA RESULTING IN OBSTRUCTIVE JAUNDICE: AN UNUSUAL COMPLICATION OF LIVER BIOPSY. (Eng.) Chiprut, R. O.; Greenwald, R. A.; Morris, S. J.; Zeppa, R.; Schiff, E. R. (Veterans Admin. Hosp., 1201 N.W. 16th St., Miami, FL 33125). *Gastroenterology* 74(1):124-127; 1978.

The case of a patient who developed obstructive jaundice as a complication of a liver biopsy is presented. The patient, a 17-yr-old girl, underwent the liver biopsy after a diagnosis of acute type B viral hepatitis was made. The biopsy was performed using the Menghini technique. The patient developed pain at the biopsy site and did not adhere to absolute bed rest. The patient experienced epigastric discomfort for 10 days after the procedure and then noted recurrence of anorexia and jaundice. She was readmitted 22 days after the biopsy with a presumed diagnosis of recurrent hepatitis. A ^{99m}Tc-sulfur-colloid liver scan revealed a large filling defect, and ultrasonography of the liver was compatible with a dilated biliary tree without visualization of a definitive mass. A "skinny" needle percutaneous transhepatic cholangiogram demonstrated a dilated right hepatic duct system with apparent blockage at the level of the bifurcation. The left hepatic biliary system was incompletely visualized. The liver enzymes and bilirubin level were elevated at this time. Twenty-four hours after beginning parenteral hydrocortisone therapy (for an allergic reaction to iodinated contrast material during an attempt to perform a hepatic arteriogram), the serum bilirubin level began to decrease. Six days later, a rose bengal scan showed normal excretion of the material into the duodenum, and a repeat ^{99m}Tc scan showed resolution of the defect. The patient was asymptomatic, although remaining hepatitis B surface antigen-positive, at a follow-up examination 65 days after the liver biopsy. It is likely that an expansion of an intrahepatic hematoma caused compression of the biliary tree. The onset of pain at the biopsy site followed by epigastric pain are highly suggestive of the development of an intrahepatic hematoma following liver biopsy.

7797 LIVER FINDINGS IN SJOGREN'S SYNDROME. (Ger.) Rau, R. (Stadtspital Triemli, Birmensdorferstrasse 497, 8063 Zurich, Switzerland). *Praxis* 66(45):1437-1441; 1977.

Studies on the hepatic involvement of the liver in Sjogren's syndrome (SS) are reviewed. Hepatomegaly has been reported in 10-20% of the patients with SS. Increased alkaline phosphatase activity was found in about 25%, increased amino transferase activities in 10-20%, and pathological BSP test in 20-50% of the patients. These changes are indicative of an impaired liver function. Abnormal thymol and cephalin flocculation tests are due to hypergammaglobulinemia, which is very common in SS. Antibodies to mitochondria and smooth muscles are markedly more frequent (8-12%) in SS than in rheumatoid arthritis or seronegative arthropathies. Liver biopsy specimens show lymphocyte and, rarely, plasma cell infiltration of the portal fields. Primary biliary cirrhosis and chronic active hepatitis are more frequent in SS than in the general population. Conversely, symptoms of SS were found in about 40% of the patients with chronic active hepatitis, and in 70-100% of the patients with primary biliary cirrhosis. The findings indicate that autoimmune liver disease is a systemic manifestation of SS.

7798 HEPATIC ANGIOGRAPHY IN HEREDITARY HEMORRHAGIC TELANGIECTASIA. (Eng.) Jaques, P.; Delany, D. (Dept. Radiology, Univ. North Carolina, Chapel Hill, NC 27514). *Gastrointest. Radiol.* 2(2):149-152; 1977.

The cases of three patients with gastrointestinal bleeding and characteristic radiologic findings of hereditary hemorrhagic telangiectasia are presented. The first two patients, a woman and her mother, developed symptoms at 41 and 49 yr of age, resp.; the third patient was a 58-yr-old man. The first patient underwent an upper gastrointestinal examination shortly before presentation that showed normal results. However, a chest x-ray demonstrated mild cardiomegaly and generalized pulmonary vascular prominence, and celiac and superior mesenteric angiography demonstrated diffuse arteriovenous shunting throughout the liver. Endoscopy revealed gastric mucosal telangiectasia, although a biopsy was reported to be normal. Visceral angiography in the first patient's mother demonstrated diffuse hepatic arteriovenous fistulas and an angioma of the right colon. Histologic features of the liver included minimal portal fibrosis and prominent subcapsular vascular spaces, but it was otherwise normal. Visceral angiography was prompted in the third patient by the presence of a loud systolic bruit in the epigastrium. Celiac and renal artery stenosis in addition to massive generalized hepatic arteriovenous fistulization were demonstrated. The liver biopsy was normal. These cases demonstrate that the chest radiograph may show a chronic mild hyperdynamic state in hemorrhagic telangiectasia and that the liver biopsy results may be unremarkable in contrast to the angiographic results.

7799 SIDE-EFFECTS OF α-METHYLDOPA ON THE LIVER. (Ger.) Goischke, H. K. (Hoher Rand 3, DDR-8020 Dresden, E. Germany). *Z. Gesamte Inn. Med.* 33(3):87-88; 1978.

7800 METABOLIC LIVER DISEASE OF CHILDHOOD. (Eng.) Kane, W. J.; Sharp, H. L. (Univ. Minnesota Health Sciences Center, Minneapolis, MN). *Pediatr. Ann.* 6(5):61-86; 1977.

7801 INDUCTION OF ANTIBODY-DEPENDENT HEPATOCYTE CYTOTOXICITY BY CHRONIC ACTIVE LIVER DISEASE SERUM, MEDIATED BY NORMAL NULL CELLS [Abstract]. (Eng.) Kawanishi, H.; MacDermott, R. P. (Univ. Michigan Medical Sch., Ann Arbor, MI). *Gastroenterology* 72(5, Part 2):1078; 1977.

7802 EVIDENCE FOR A GENETIC CONTRIBUTION TO CELL MEDIATED CYTOTOXICITY (CMC) IN CHRONIC ACTIVE LIVER DISEASE (CALD) [Abstract]. (Eng.) Vogten, A. J. M.; Summerskill, W. H. J.; Shorter, R. G.; Opelz, G. (Mayo Clinic, Rochester, MN 55901). *Gastroenterology* 72(5, Part 2):1145; 1977.

7803 "EMPTY" NUCLEI OF HEPATOCYTES IN HEPATOCEREBRAL DYSTROPHY AND OTHER DISEASES. (Rus.) Makarova, V. A.; Zus', B. A.; Maslovskaia, I. V.; Reiskanen, A. V.; Loginova, L. V.; Shulutko, B. I. (Leningrad Inst. Medicine Hygiene, Leningrad, USSR). *Arkh. Patol.* 38(7):45-52; 1976.

7804 ASSOCIATIONS OF DISEASES INVOLVING THE LIVER, GALLBLADDER, AND PANCREAS. (Ger.) Pusch, H. J.; Roschlau, T. (Medizinische Universitats-Poliklinik, Klinikstrasse 8, 8700 Wurzburg, W. Germany). *Therapiewoche* 27(48):8732-8741, *passim;* 1977.

7805 ABSCESS OF THE LIVER. (Fle.) Eyskens, E.; Timmermans, U.; Vanderputte, S. (Universitaire Instelling Antwerpen, Universiteitsplein 1, B-2610 Wilrijk, Antwerp, Belgium). *Acta Chir. Belg.* 76(4):407-415; 1977.

7806 HEPATIC ABSCESSES, BOTH INTRA- AND EXTRAHEPATIC. (Eng.) DeBakey, M. E.; Jordan, G. L., Jr. (Baylor Coll. Medicine, Houston, TX). *Surg. Clin. North Am.* 57(2):325-337; 1977.

7807 CRYPTOGENIC PYOGENIC LIVER ABSCESS. (Nor.) Solheim, K.; Gronmark, T.; Evensen, K. A.; Nerdrum, H. J. (Telemark Sentralsjukehus, Skien, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):9-11; 1978.

7808 PRIMARY LIVER CANCER IN A 17-YEAR-OLD WOMAN. (Rus.) Martynov, G. V. (Regional Hosp. No. 1, Ul'ianovsk, USSR). *Vopr. Onkol.* 23 (9):85-86; 1977.

7809 DIAGNOSIS OF PRIMARY LIVER CANCER. (Cze.) Pejchl, S.; Pejchlova, J. (II. Interni klinika fakulty detskeho lekarstvi KU, Prague, Czechoslovakia). *Cesk. Gastroenterol. Vyz.* 30(1): 47-51; 1976.

7810 DIAGNOSIS OF CARCINOMA OF THE BILIARY TRACT AND THE PANCREAS--WITH SPECIAL REFERENCE TO THE ROLE OF CHOLANGIOGRAPHIC STUDIES [Abstract]. (Eng.) Naito, Y.; Nakazawa, S. (Nagoya Univ. Sch. Medicine, Nagoya, Japan). *Gastroenterol. Jpn.* 12(1):86; 1977.

7811 SIGNIFICANCE OF LIVER SCINTIGRAPHY IN THE LOCALIZATION OF TUMOROUS LESIONS OF THE PARENCHYMA. (Ger.) Bekier, A. (Kantonsspital, CH-9006 St. Gallen, Switzerland). *Therapiewoche* 27(46):8274-8280, *passim;* 1977.

7812 HEPATIC METASTASIS OF DIGESTIVE CARCINOID TUMORS. (Eng.) Murat, J. (Centre Hospitalier-Universitaire, Tours, France). *Chir. Gastroenterol.* 10(3):281-295; 1976.

7813 INTRAHEPATIC CHOLESTASIS WITH LYMPHOGRANULOMATOSIS. (Nor.) Bjorneklett, A.; Astor, T.; Elgjo, K. (Medisinsk avdeling A, Rikshospitalet, Norway). *Tidsskr. Nor. Laegeforen.* 98(1):13-14; 1978.

7814 CHOLESTEROL STORAGE DISEASE OF THE LIVER IN CHILDHOOD. (Ger.) Keller, E.; Kunnert, B.; Braun, W. (Universitats-Kinderklinik, Oststr. 21, DDR-705 Leipzig, E. Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 37(5/6):231-236; 1977.

7815 HEPATIC COMA: ITS CAUSES, DIAGNOSIS, AND TREATMENT. (Ger.) Zipprich, B.; Nilius, R.; Otto, L.; Busse, H. J. (I. Medizinische Universitatsklinik, Leninallee 22, DDR-402 Halle [Saale], E. Germany). *Z. Gesamte Inn. Med.* 32(12):259-265; 1977.

7816 THERAPY OF HEPATIC ENCEPHALOPATHY AND HEPATIC COMA. (Ita.) Pagliaro, L.; Le Moli, S.; D'Amico, G. (Istituto di Semeiotica Medica, Palermo, Italy). *Fegato* 23(1):83-100; 1977.

7817 RECENT DATA ON THE TREATMENT AND PATHOGENESIS OF HEPATIC COMA. (Ita.) Casciani, C. U.; Ancarani, E. (Cattedra di Semeiotica Chirurgica III, Universita, Rome, Italy). *Recent. Prog. Med. (Roma)* 63(2):196-211; 1977.

7818 HEPATIC COMA IN OCCLUSIVE MESENTERIC INFARCTION. (Ger.) Duker, E.; von Gaisberg, U.; Heinkel, K. (Krankenhaus Bad Cannstatt, Priessnitzweg 24, D-7000 Stuttgart 50, W. Germany). *Munch. Med. Wochenschr.* 119(44):1429-1430; 1977.

7819 ACUTE HEPATIC INSUFFICIENCY IN CONGESTIVE HEART FAILURE. (Fre.) Vo Huu Tri; Scheinmann, N.; Thomas, M. (Hopital Saint-Antoine, 184, rue du Faubourg Saint-Antoine, F 75571 Paris Cedex 12, France). *Ann. Med. Interne (Paris)* 128(12): 965-968; 1977.

See also, 7485, 7486, 7487, 7488, 7491, 7496, 7634, 7639, 7643, 7826, 7841, 7855, 7859, 7861, 7862, 7885, 7909, 7911, 7927, 7934, 7935, 7936, 7941, 7942, 7943, 7948, 7949, 7952, 7956, 7957, 7970.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

7820 THE BRONZE BABY SYNDROME: A COMPLICATION OF PHOTOTHERAPY. (Ger.) Radermacher, E. H.; Noirfaise, A.; Hornchen, H.; Maier, R. D.; Bigalke, K. H. (Abteilung Kinderheilkunde, RWTH, Goethestr. 27-29, 5100 Aachen, W. Germany). *Klin. Paediatr.* 189(5):379-384; 1977.

A premature twin baby (birth weight 800 g) with an increased bilirubin level (3.5 mg/100 cm^3) and without kernicterus underwent phototherapy (3,700 lux, 150 W, wavelength 390-490 nm) beginning immediately after birth. The total serum bilirubin level rose to 10.5 mg/100 cm^3 on the 6th day of life during the treatment, and dropped to 8.5 mg/100 cm^3 on the 8th day. This increase was accompanied by an intense greyish-brown discoloration of the skin, serum, urine, peritoneum, spleen, liver, urinary bladder, pericardium, and visceral pleura. An increased coproporphyrin level was found in the serum. The patient died from hyalinization of the lungs, kidney failure, and consumption coagulopathy on the 11th day of life. The bilirubin breakdown products, present in high concentration, may exert neurotoxic effects, because they are not eliminated adequately by the normal biliary tract in bronze baby syndrome.

7821 THE DUBIN-JOHNSON SYNDROME. (Fre.) Van de Velde, J. M.; Parent, M. (Notre-Dame Hosp., P.O. Box 1560, Station C, Montreal, Canada). *Union Med. Can.* 106(12):1630-1634; 1977.

Five cases of the Dubin-Johnson syndrome are reported in patients aged 9, 15, 45, 50, and 56 yr. The syndrome can be differentiated from Gilbert's disease by the presence of conjugated bilirubin in the urine, hepatic pigmentation, and abnormal retention of BSP. The Dubin-Johnson syndrome must also be differentiated from the Rotor syndrome, which appears to be an attenuated form of the disease. Often, patients in the same families have one or the other of these latter two syndromes. Transmission of the Dubin-Johnson syndrome is probably by an autosomal dominant allele with feeble penetration. Prognosis is excellent, and only phenobarbital is recommended as treatment.

7822 HEPATIC JAUNDICE OF HEREDITARY ORIGIN. (Por.) de Magalhaes, A. F. N. (Ciencias Medicas da Universidade Estadual de Campinas, Sao Paulo, Brazil). *Arq. Gastroenterol.* 14(4):215-223; 1977.

See also, 7860.

7823 ALLOPURINOL HEPATOTOXICITY: CASE REPORT AND LITERATURE REVIEW. (Eng.) Chawla, S. K.; Patel, H. D.; Parrino, G. R.; Soterakis, J.; LoPresti, P. A.; D'Angelo, W. A. (Queens Hosp. Center, 84-69 164th St., Jamaica, NY 11432). *Arthritis Rheum.* 20(8):1546-1549; 1977.

A case of allopurinol hepatotoxicity is reported, and the literature concerning this complication is reviewed. The patient was a 44-yr-old man with gouty arthritis who had been receiving 300 mg of allopurinol daily for 1 week prior to admission. At this time, he had a 3-day history of diplopia, left upper quadrant fullness, and pain. Hepatosplenomegaly was present, and the SGOT, alkaline phosphatase, and total bilirubin levels were 50 mU/ml, 98 mU/ml, and 1.8 mg%, resp. Liver biopsy revealed fatty changes, focal necrosis, and noncaseating granulomata with scattered eosinophils. The patient's symptoms improved promptly after allopurinol was discontinued, and the hepatosplenomegaly disappeared after 4 weeks. Six cases of allopurinol-induced hepatotoxicity have been reported, and the present case is the third with allopurinol-induced granulomatous hepatitis.

7824 HEPATITIS DUE TO HALOGENATED ANESTHETICS. (Fre.) Duheille, J. (Faculte A de Medecine de Nancy-Brabois, Boite postale n° 1080, 54019 Nancy Cedex, France). *Ann. Anesthesiol. Fr.* 17(3): 339-345; 1976.

The incidence of hepatitis following anesthesia with halothane is about 1 in 35,000. It can occur at any age, but the patient over 45 yr old is somewhat more susceptible, and the postmenopausal woman is a most likely candidate. Repeated exposure to halothane anesthesia has been incriminated etiologically, but hepatitis does occur after a single exposure. The hepatitis signs (fever, chills, rash, icterus) may appear within 4-17 days after anesthesia. The hepatitis can resolve spontaneously or progress to a fatal outcome. Biopsy or autopsy studies of the liver show pathology ranging from simple cholestasis to that resembling viral hepatitis or chronic active hepatitis. The mechanisms of hepatitis induced by halothane are discussed from the aspect of determining the susceptible patient prior to operation. Autoimmunization to liver components appears to be the most likely mechanism. Routine immunological testing, particularly for the antinuclear antibody with the Dane particle, although technically rather difficult, may serve to identify susceptible patients.

7825 ELEVATION OF SERUM XANTHINE OXIDASE ACTIVITY FOLLOWING HALOTHANE ANESTHESIA IN MAN. (Eng.) Giler, S.; Eshel, Y.; Pinkhas, J.; Ventura, E.; Levy, E.; Urca, I.; *et al.* (Tel-Aviv Univ. Medical Sch., Beilinson Medical Center, Petah-Tikva, Israel). *Experientia* 33(10):1356-1358; 1977.

The specific and highly sensitive marker for acute liver damage, serum xanthine oxidase (SXO), was used to clarify whether halothane or methoxyfluorane is hepatotoxic in man. Of 60 patients without liver disease who were undergoing elective surgery, 31 received halothane (1.0%), 12 received methoxyfluorane (1.0% for 5 min, then 0.5% for remainder of operation), and 17 patients served as controls. In controls (who received Fentanyl, 0.002 mg/kg and Alloferine, 0.2 mg/kg, i.v.), the mean SXO, lactate dehydrogenase (LDH), and SGOT values following anesthesia were not significantly elevated, in comparison with the preoperative values. In the halothane group, in comparison with the preoperative values, there was a significant elevation in SXO activity immediately following completion of anesthesia, the activity increasing to maximum value on the 3rd postoperative day (>sixfold the preoperative value), and then decreasing gradually. The SXO level was still significantly elevated on the 7th postoperative day, the last day it was measured. When the SXO levels on the different days following halothane anesthesia were compared with the respective values obtained in the control group, a significant elevation was found immediately following anesthesia and on the 1st and 3rd postoperative days only. The post-halothane LDH and SGOT levels, which rose significantly when compared with their respective preoperative values, the former on the first ($p<0.01$), third ($p<0.001$), and fifth ($p<0.01$), the latter on the first ($p<0.05$) and third ($p<0.01$) postoperative days, did not differ significantly from the respective values following control anesthesia. The mean SXO level in the methoxyfluorane-treated patients was significantly elevated above the preoperative level only on the first postoperative day (almost fourfold) but when compared with the respective values following control anesthesia, no significant elevation was found at any time. LDH and SGOT levels were also not altered. These results suggest that halothane, but not methoxyflurane, causes specific hepatocellular damage.

7826 ENTERIC FEVER: A CLINICOPATHOLOGIC STUDY OF 104 CASES. (Eng.) Nasrallah, S. M.; Nassar, V. H. (Emory Univ. Sch. Medicine, 69 Butler St., S.E., Atlanta, GA 30303). *Am. J. Gastroenterol.* 69(1):63-69; 1978.

A clinicopathologic study of 104 cases of culture-proven enteric fever was conducted to review the systemic manifestations and complications of the disease and to emphasize the frequency and significance of liver involvement. One fatal case with disseminated intravascular coagulation is described in detail. Clinical findings included fever (100% of cases), bradycardia (75%), splenomegaly (43%), hepatomegaly (33%), and rose spots (9%). The prin-

cipal complications were anemia (64% of those tested), typhoid hepatitis (30%, judged by combined bilirubin, SGOT, and SGPT values), relapse (12%), and bleeding (occult, 12%; gross, 6%). The mean values of the abnormal liver tests included a total bilirubin of 8.1 mg%, an SGOT of 82 ImU, and an SGPT of 86 ImU. Liver enlargement occurred in one-third of the patients; however, 55% of all cases with abnormal elevations of SGOT and/or SGPT showed no liver enlargement. Abnormal liver tests in four of seven patients with relapse indicate a relationship between relapse and typhoid hepatitis. In these patients, the Kupffer cells were enlarged and hyperplastic. In all cases, pathology consisted of typhoid nodules of variable size and frequency depending on the severity of the condition. The fatal outcome of a rare complication of enteric fever, consumptive coagulopathy, is reported; early recognition of this rare occurrence is vital. Most of the complications were reversible following antibiotic therapy with chloramphenicol (the drug of choice) or Co-Trimoxazole.

7827 HEPATIC INJURY DUE TO PYRIDINOL CARBAMATE. (Eng.) Enat, R.; Barzilai, D.; Gellei, B. (Rambam Medical Center, Haifa, Israel). *Isr. J. Med. Sci.* 14(3):333-338; 1978.

7828 GRANULOMATOUS HEPATITIS IN A HEALTHY ADULT FOLLOWING BCG INJECTION INTO A PLANTAR WART. (Eng.) D'Alessandri, R. M.; Khakoo, R. A. (West Virginia Univ. Medical Center, Morgantown, WV 26506). *Am. J. Gastroenterol.* 68(4):392-395; 1977.

7829 A CLINICAL PHARMACOLOGIST'S VIEW OF DRUG HEPATOTOXICITY. (Eng.) Dujovne, C. A. (Univ. Kansas Medical Center, Kansas City, KS). *Pharmacol. Res. Commun.* 9(1):1-15; 1977.

See also, 7781, 7799.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

7830 ON THE LATE PROGNOSIS OF TYPE A VIRUS HEPATITIS. (Eng.) Weigl, E.; Bach, H. (Hosp. Eisenhuttenstadt, DDR--122 Eisenhuttenstadt, E. Germany). *Acta Hepatogastroenterol. (Stuttg.)* 24(5):355-356; 1977.

The prognosis of type A viral hepatitis was studied in 1,283 cases that occurred in one East German town between 1960 and 1970. Pathological sequelae of the acute disease developed in 8.2% of all these cases. Seventy-nine patients developed chronic persistent hepatitis, and five others developed chronic aggressive hepatitis. Acute viral hepatitis progressed directly to cirrhosis in 6 patients, and alcohol worsened the course of the disease in 10 patients. At the end of the observation period, 29 patients still showed pathological sequelae, and 9 are dead.

7831 HB-Ab IN SWEAT. (Eng.) Telatar, H.; Kayhan, B.; Kes, S.; Karacadag, S. (Gaziosmanposa, Hereke Sokak No. 4, Ankara, Turkey). *Am. J. Gastroenterol.* 68(5):492-493; 1977.

The sweat of 10 patients with hepatitis B surface antigen (HBsAg)-positive liver cirrhosis and 20 patients with HBsAg-positive viral hepatitis was examined by radioimmunoassay for the presence of HBsAg. The sweat (1.5 ml) was collected, dried, and dissolved in 0.2 ml of buffer solution. The sweat from all patients was found to be HBsAg-positive. This study indicates that direct contact is one of the most important factors in the epidemiology of this disease and may be even more important in asymptomatic carriers.

7832 SIMULTANEOUS PRESENCE IN SERUM OF HBsAg AND ANTI-HBs OF DIFFERENT SPECIFICITIES. (Eng.) Moraczewska, Z.; Madalinski, K.; Holland, P. V. (Inst. Hematology, Warsaw, Poland). *Intervirology* 9(3):189-192; 1978.

The case of a patient in whom hepatitis B surface antigen (HBsAg) and antibodies to HBsAg (anti-HB) of different specificities were found in the serum during his third attack of acute viral hepatitis is presented. The patient had attacks of hepatitis 29 and 67 days apart. The presence of HBsAg was established by complement fixation and was found to be subtype *ayw*. The serum was checked against

a panel of HBs antigens of *adw* and *ayw* subtypes. Precipitation reactions were obtained with all 12 HBsAg sera of subtype *adw* but not with any of the 8 HBsAg/*ayw* sera employed. Absorption of anti-HBs present in the serum sample, presumably monospecific anti-*d* antibody, was attempted. The patient's serum was absorbed with HBsAg/*adw*- or HBsAg/*ayw*-containing serum, and the results were compared to absorption with HBsAg-negative serum. Only the HBsAg/*adw* serum absorbed the anti-HBs from the sample. The patient's serum reacted only with HBs antigens that contained the *d* determinant, thus confirming it was a monospecific anti-*d* antibody. Electron microscopy showed no evidence of circulating immune complexes in the precipitate after centrifuging. These results indicate that both HBsAg of *ayw* specificity and monospecific anti-HBs/*d* antibody were present. This condition probably results from two infections with hepatitis B viruses of different subtypes--first *adw* and then *ayw*.

7833 NON-A NON-B HEPATITIS. (Eng.) Anonymous. (No affiliation given). *Br. Med. J.* 1(6118):942-944; 1978.

Current information on non-A non-B hepatitis is briefly reviewed. Studies on post-transfusion cases have shown that the mean incubation period is similar to that of hepatitis B, although it ranges from 18 to over 100 days. The clinical course is also similar to hepatitis B, but the symptoms, jaundice, and peak bilirubin and transaminase levels are more short-lived. The disease is thought to be spread by both parenteral and non-parenteral routes. The results of an inoculation study in which blood from asymptomatic blood donors implicated in transmitting post-transfusion hepatitis was inoculated into volunteers suggest that there exists a transmissible agent and a chronic carrier state in non-A non-B hepatitis, and this has been substantiated by studies in chimpanzees, in which there has been evidence of successful transmission. Two studies have shown that gamma-globulin is useful in preventing non-A non-B hepatitis. These studies also showed that 60-90% of post-transfusion hepatitis in the United States is currently non-A non-B and that it is transmitted mostly through commercial blood donations. An important obstacle to diagnosing non-A non-B hepatitis is the lack of a commercial kit for the diagnosis of hepatitis A antigen. A more direct method for the characterization of non-A non-B agent(s) by a serological test may soon be possible.

7834 VIRAL HEPATITIS. (Fre.) Cappel, R. (Institut Pasteur du Brabant, Brabant, Belgium). *Brux. Med.* 57(10):445-451; 1977.

7835 VIRAL HEPATITIS: PROGRESS AND PROSPECTS. (Ger.) Poley, J. R. (Department fur Kinderheilkunde der Universitat Ulm, Prittwitzstrasse 43, 79 Ulm [Donau], W. Germany). *Helv. Pediatr. Acta* 32(1):5-9; 1977.

7836 CURRENT PROGRESS IN THE AREA OF VIRAL HEPATITIS. (Ger.) Deinhardt, F.; Frosner, G. G. (Max v. Pettenkofer-Institut fur Hygiene und Medizinische Mikrobiologie, Pettenkoferstrasse 9a, D-8000 Munich 2, W. Germany). *Internist (Berlin)* 18(4):188-194; 1977.

7837 VIRAL HEPATITIS: PART 3. (Fre.) Lemaire, A. (37, avenu de Breteuil, 75007 Paris, France). *Ann. Gastroenterol. Hepatol.* 13 (5):479-486; 1977.

7838 HEPATITIS A. (Dut.) Zanen-Lim, O. G. (Laboratorium voor de Gezondheidsleer, Amsterdam, Netherlands). *Ned. Tijdschr. Geneeskd.* 121(45):1812-1815; 1977.

7839 SOME ASPECTS OF DIFFERENTIAL DIAGNOSIS OF ACUTE VIRAL, PHARMACOLOGIC, AND ALCOHOLIC HEPATITIS. (Rus.) Tareev, E. M.; Semendyaeva, M. E.; Mukhin, A. S.; Vinogradova, L. G.; Blinkov, I. L. (I. M. Sechenov First Moscow Medical Inst., Moscow, USSR). *Vestn. Akad. Med. Nauk SSSR* (9):30-35; 1977.

7840 EXPERIENCE WITH THE DETERMINATION OF HBs-ANTIGEN (AUSTRALIA ANTIGEN) BY THE COMPLEMENT-BINDING REACTION. (Ger.) Reiske, J. (Bezirkshygieneinspektion und Bezirkshygieneinstitut Erfurt, Pfafferode 23, DDR-57 Muhlhausen, E. Germany). *Dtsch. Gesundheitsw.* 32(31):1453-1458; 1977.

7841 VALUE OF HEPATITIS B ANTIGEN IN THE DIFFERENTIAL DIAGNOSIS OF LIVER DAMAGE IN CHILDREN. (Rus.) Moskovskaia, I. A.; Alekhina, Z. S.; Zuev, P. D. (Second Children's Hosp., Tula, USSR). *Pediatriia* (7):77-78; 1977.

7842 EPIDEMIOLOGY OF VIRAL HEPATITIS. (Ita.) Giusti, G.; Piccinino, F.; Galanti, B.; Ruggiero, G. (Clinica delle Malattie Infettive, Universita di Napoli, Naples, Italy). *Fegato* 22 (1/2/3):47-96; 1976.

7843 ALIMENTARY HEPATITIS EPIDEMIC. (Ger.) Scholtze, H. K.; Ullmann, R.; Poch, M.; Schulze, B. (Bezirks-Hygiene-Inspektion, Prediger Str. 6, DDR-50 Erfurt, E. Germany). *Dtsch. Gesundheitsw.* 32(8):377-383; 1977.

7844 TRANSMISSION OF BACTERIAL AND VIRAL (HEPATITIS VIRUS B) INFECTIONS BY ENDOSCOPY OF THE UPPER GASTROINTESTINAL TRACT. (Dut.) Piette, M.; Elewaut, A. (No affiliation given). *Tijdschr. Gastroenterol.* 20(1):57-59; 1977.

See also, 7497, 7781, 7793, 7847, 7905.

LIVER AND BILIARY TRACT

Chronic Hepatitis

7845 SERUM SOMATOMEDIN PEPTIDES MEASURED BY SOMATOMEDIN A RADIORECEPTOR ASSAY IN CHRONIC LIVER DISEASE. (Eng.) Takano, K.; Hizuka, N.; Shizume, K.; Hayashi, N.; Motoike, Y.; Obata, H. (Tokyo Women's Medical Coll., Tokyo 162, Japan). *J. Clin. Endocrinol. Metab.* 45(4):828-832; 1977.

Serum somatomedin levels were determined, using a somatomedin A radioreceptor assay, in 25 patients with liver cirrhosis, 28 patients with chronic hepatitis, and 131 healthy subjects. The levels in normal subjects ranged from a mean of 1.00 ± 0.23 U/ml in those aged 20-29 yr to 0.80 ± 0.26 U/ml in those aged 60-86 yr. The mean level in the cirrhotic patients (0.47 ± 0.05 U/ml) and that in the patients with chronic hepatitis (0.60 ± 0.04 U/ml) were significantly lower than that in the normal controls ($p<0.005$). The levels of somatomedin A in the patients with liver cirrhosis were lower than those in the patients with chronic hepatitis ($0.05<p<0.1$). In the cirrhotic patients and the patients with chronic hepatitis, there were positive correlations between the somatomedin level and the (a) albumin level ($r=0.53$, $p<0.005$), (b) cholinesterase level ($r=0.53$, $p<0.005$), (c) total cholesterol level ($r=0.70$, $p<0.01$), and (d) thrombotest ($r=0.61$, $p<0.05$). There was a negative correlation between somatomedin A and the indocyanine green retention test ($r=-0.50$, $p<0.05$). These results confirm earlier results obtained with bioassay.

7846 CORE AND COAT OF THE HEPATITIS B-VIRUS AND CYTOPLASMIC VIRUS-LIKE PARTICLES IN CHRONIC HEPATITIS: AN ELECTRON MICROSCOPIC STUDY. (Ger.) Kendrey, G. (Laszlo Korhaz, Gyali ut. 5/7, 1097 Budapest, Hungary). *Zentralbl. Allg. Pathol.* 121 (415):450-455; 1977.

The light microscopic and electron microscopic findings in liver biopsy specimens from a woman who received immunosuppressive therapy with corticosteroids and Imuran for chronic active hepatitis are presented. Round cell infiltration of the portal connective tissue was seen. The inflammatory and necrotic changes were less marked than before the Imuran treatment. Isolated or clustered ring-shaped formations with a diameter of 20-25 nm (cores) were found in the nucleus of nearly all epithelial cells examined. Most of these particles were localized near the nuclear membrane, sometimes in the pars amorpha. These particles were found to consist of osmiophilic granules 2-3 nm in diameter. Core particles were found only occasionally in the cytoplasm. Electron-dense filaments of varying length, and with a diameter of about 23 nm (surface antigen, coat) were found in the canaliculi of the smooth endoplasmic reticulum of the ground glass hepatocytes. Dane particles were not seen at all. Isolated spherical or ring-shaped virus-like particles with a diameter of 80 nm were found in some cells, mainly in the hyaloplasm; they may be due to a second virus infection. The immunosuppressive treatment is assumed to have played a certain role in the appearance of B virus components, because they were absent in the biopsy specimens taken before the immunosuppressive treatment.

7847 COMPARATIVE EPIDEMIOLOGICAL STUDIES OF CHRONIC AND ACUTE VIRUS HEPATITIS IN LENINGRAD (1964-1974). (Rus.) Shlyakhtenko, L. I.; Nechaev, V. V. (Leningrad Sanitary-Hygiene Medical Inst., Leningrad, USSR). *Vestn. Akad. Med. Nauk SSSR* (9):22-25; 1977.

7848 CHRONIC ACTIVE HEPATITIS. CONCEPTUAL, CLINICAL, AND IMMUNOLOGICAL CONSIDERATIONS ON 20 CASES. (Spa.) Trujillo Rodriguez, F.; Rubio, J. M.; Ruiberriz de Torres, R.; De La Vega, J. M.; Bolanos, A.; Holgado, C.; *et al.* (Hospital Universitario, Seville, Spain). *Rev. Esp. Enferm. Apar. Dig.* 49(6):719-728; 1977.

7849 CHRONIC HEPATITIS. (Ger.) Siede, W. (Zentrum der Inneren Medizin, Johann Wolfgang Goethe-Universitat, Theodor-Stern-Kai 7, 6000 Frankfurt a. M. 70, W. Germany). *Therapiewoche* 27 (38):6568-6579; 1977.

See also, 7797.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

7850 HISTOLOGICAL AND BIOCHEMICAL INDICES OF PROGRESSIVE LIVER INJURY IN PATIENTS WITH ALCOHOLIC FATTY LIVER. (Eng.) Van Waes, L.; Demeulenaere, L.; Lieber, C. S. (Bronx Veterans Admin. Hosp., Bronx, NY). *Acta Gastroenterol. Belg.* 40(7/8):271-277; 1977.

Histological and biochemical abnormalities that may be indices of progressive liver injury in patients with alcoholic fatty liver are reviewed. In long-term follow-up studies, 38-58% of patients who developed alcoholic hepatitis before the presence of fibrosis or cirrhosis rapidly progressed to cirrhosis. Studies in the baboon indicate that pericentral sclerosis in the absence of manifest alcoholic hepatitis is also a precursor lesion of cirrhosis. In some baboons, chronic alcohol feeding induced central sclerosis beginning at the fatty liver stage and invariably progressing to fibrosis or cirrhosis. Animals that did not develop the lesion did not progress beyond fatty liver. The fate of the lesion upon abstinence from alcohol remains to be documented. The use of blood transaminase levels as a biological marker of alcohol-induced liver disease is not satisfactory because the values are only moderately elevated in alcoholic hepatitis and do not reflect the degree of liver cell necrosis. Ornithine carbamyl transferase activity reflects liver cell necrosis more reliably than do the activities of transaminases, but its determination procedure is cumbersome. Persistence of elevated levels of plasma gamma-glutamyl transpeptidase (γ-GTP) despite abstinence from alcohol indicates underlying liver disease, but there are considerable overlaps between serum γ-GTP levels in patients with and without significant necrosis. Measurement of glutamate dehydrogenase (GDH) activity can discriminate between patients with and without alcoholic hepatitis, and falsely elevated levels in the absence of necrosis are uncommon in alcoholics. None of the enzyme activities reflects the stage of disease. Alcoholic hepatitis, pericentral sclerosis, and elevated GDH levels appear to be the most promising markers of progressive alcoholic liver injury.

7851 PLASMA AMINO ACID ABNORMALITIES IN THE ALCOHOLIC: RESPECTIVE ROLE OF ALCOHOL, NUTRITION, AND LIVER INJURY. (Eng.) Shaw, S.; Lieber, C. S. (Bronx Veterans Admin. Hosp., 130 W. Kingsbridge Rd., Bronx, NY 10468). *Gastroenterology* 74(4):677-682; 1978.

To evaluate the respective roles of alcohol consumption, nutrition, and liver injury in producing plasma amino acid abnormalities in the alcoholic, the levels of plasma amino acids were measured in 56 alcoholics with varying degrees of liver injury and nutritional status in 32 nonalcoholics with liver injury, and in 20 well-nourished nonalcoholic patients without history of liver or gallbladder disease. In addition, plasma amino acid levels were measured in baboons fed ethanol as 50% of total calories (a model system with precise dietary control). In 13 alcoholics with prolonged dietary protein deficiency (<56 g/day for >2 weeks), the levels of valine (val), leucine (leu), and isoleucine (isl) were significantly lower ($p<0.01$, $p<0.02$, and $p<0.05$, resp.) than in 15 alcoholics with short-term or no deficiency. In 12 alcoholics sampled after 1-4 days of abstinence, the level of α-amino-*n*-butyric acid (AANB) was significantly ($p<0.02$) increased, and there was a tendency toward increased levels of val, leu, and isl compared to 12 alcoholics of comparable nutritional status sampled after 5 or more days of abstinence. Consumption by three alcoholics of 2,000 kcal alcohol with an adequate diet for 2-4 weeks produced a significant increase in the levels of AANB ($p<0.001$) and isl ($p<0.05$) and marked increases in the levels of leu and val; 1-2 weeks after the withdrawal of alcohol, all the measured parameters fell to levels not significantly different from those of the initial control period. When plasma amino acid levels were measured longitudinally in baboons fed alcohol as 50% of total calories for up to 1-4 yr, the levels of branched-chain amino acids (BCAA) and AANB were slightly but significantly increased by 8-12 weeks ($p<0.02$ for leu and $p<0.001$ for AANB) and markedly increased by 27-47 weeks and 1-4 yr ($p<0.001$ at both times for both parameters). Moderate liver injury in either patients or baboons did not significantly affect plasma BCAA or AANB levels. In alcoholics with severe liver injury (cirrhosis and portal hypertension) who underwent nutritional repletion, there were significant decreases in the plasma levels of leu, isl, and val ($p<0.001$, $p<0.001$, and $p<0.01$, resp.) compared to alcoholics with minimal liver injury who underwent similar repletion. The results show that the plasma amino acid levels in alcoholics are affected by at least three factors: protein intake, alcohol consumption, and severity of liver injury.

7852 INTERNAL DISEASES AS SEQUELAE OF CHRONIC ALCOHOLISM. (Ger.) Stefenelli, N. (Krankenhaus, Hohensteinstrasse 68, A-3500 Krems, Austria). *Wien. Med. Wochenschr.* 127(18):565-569; 1977.

7853 EFFECTS OF CHRONIC ALCOHOLISM ON THE DIGESTIVE TRACT. (Fre.) Crismer, R. (Hopital de Briancon [Hautes-Alpes], 4, route des Guibertes, 05220 Le Monetier-Les-Bains, France). *Ann. Gastroenterol. Hepatol.* 13(2):83-100; 1977.

7854 ALCOHOLISM AND THE LIVER. (Ita.) Lieber, C. S.; Leo, M. A. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY). *Fegato* 23(1):39-54; 1977.

7855 ALCOHOLISM IN ANAMNESIS AND LIVER MORPHOLOGY [Abstract]. (Ger.) Regele, H. (No affiliation given). *Wien Med. Wochenschr.* 127(12): 409; 1977.

7856 ALA DEHYDRATASE ACTIVITY OF ERYTHROCYTES IN CHRONIC ALCOHOLICS AND IN CIRRHOTIC ALCOHOLICS AND NONALCOHOLICS. (Ita.) Cambiaghi, G.; Duca, G. P.; Meroni, M. (Istituti Clinici di Perfezionamento, Milan, Italy). *Atti Accad. Med. Lomb.* 31(2):237-238; 1976.

See also, 7494, 7497, 7780, 7781, 7788, 7839.

7857 PRIMARY BILIARY CIRRHOSIS IN MOTHER AND DAUGHTER. (Eng.) Fagan, E.; Williams, R.; Cox, S. (King's Coll. Hosp. and Medical Sch., London SE5, England). *Br. Med. J.* 2(6096):1195; 1977.

The case reports of a mother and daughter in whom environmental factors seemed to play an important part in the pathogenesis of primary biliary cirrhosis are presented. The propositus, a 43-yr-old woman who had been in Singapore from 1964 to 1966, presented with hepatomegaly and melena. She had experienced abdominal discomfort and flatulence thereafter and had noticed intermittent pruritus since 1974. Antinuclear antibodies, smooth muscle antibodies, rheumatoid factor, cold agglutinins, and hepatitis B surface antigen were not present. Liver biopsy showed a typical pattern of biliary-type cirrhosis. The patient's mother presented at the age of 69 yr with melena. She complained of severe long-standing Raynaud's phenomenon. She had been separated from her daughter for 1 yr in 1964, but she then rejoined her in Singapore in 1965. Liver function tests were abnormal, and varices were present. Over the next 5 months, she developed pruritus and further melena and hematemesis. Ascites and a cirrhotic liver were found at laparotomy, and the findings on biopsy were consistent with primary biliary cirrhosis. The patient died despite a portacaval shunt. Only the mother and daughter in this family continued to live together, and this, together with the fact that they presented with primary biliary cirrhosis within 5 yr of each other, suggests that an environmental factor, probably interacting with genetic components, may have been of importance in initiating bile duct destruction.

7858 INSULIN RESISTANCE AND BLOOD GLUCOSE REPLACEMENT RATES IN LIVER CIRRHOSIS: STUDIES WITH ^{14}C-GLUCOSE. (Ger.) Adlung, J.; Kelch, L.; Peters, J.; Grazikowske, H. (Medizinische Hochschule, Kronsforder Allee 71/73, D-2400 Lubeck, W. Germany). *Z. Gastroenterol.* 15(9):553-564; 1977.

Blood glucose replacement and insulin resistance were studied in 21 patients with inactive liver cirrhosis, 8 patients with chemical diabetes, 11 patients with overt senile diabetes, and 35 normal subjects by the i.v. injection of 0.5 g/kg glucose containing ^{14}C-labeled glucose. Impaired glucose tolerance was found in 71% of the cirrhotic patients. The insulinogenic index was elevated in the patients with liver cirrhosis and normal glucose tolerance, and it was normal or below normal in those with carbohydrate intolerance, as well as in diabetics. The decrease in the specific activity of glucose, expressing the supply of nonlabeled glucose to the body pool, was much more rapid in patients with carbohydrate intolerance, either hepatogenic or not, than in carbohydrate-tolerant patients when compared at equal glucose concentrations. Moreover, all patients with deteriorated glucose tolerance exhaled less $^{14}CO_2$ than did glucose-tolerant subjects. Consequently, diabetes in chronic liver disease displays the same abnormalities as diabetes in obesity with respect to liver glucose supply and glucose oxidation. In both conditions, diminished glucose assimilation is usually the result of reduced elimination and increased supply. Therefore, impaired hepatic uptake of glucose cannot be implicated as a single cause of hepatogenic diabetes.

7859 GROUP-SPECIFIC COMPONENT [Gc] LEVELS IN CHRONIC LIVER DISEASE. (Eng.) Mihas, A. A.; Hirschowitz, B. I. (Div. Gastroenterology, Univ. Alabama, Birmingham, AL 35294). *J. Med.* 9(2):109-115; 1978.

To elucidate the biologic function of group-specific component (Gc), serum Gc concentrations were measured by radial immunodiffusion in 72 patients with chronic liver disease and correlated with liver function measurements. Gc, an alpha-2-globulin (50,000 daltons) synthesized in the liver, is the proposed vitamin D transport protein. In all cases (liver cirrhosis, 28; metastatic liver disease, 15; chronic active hepatitis [CAH], 11; biliary tract disease, 18), diagnosis of liver disease was confirmed by needle biopsies. Liver function tests included measurements of the serum levels of bilirubin, SGOT, alkaline phosphatase, albumin, and bile acids (SBA). Low Gc values correlated with low serum albumin levels and high Gc levels correlated with high SGOT levels. An inverse relationship was observed between SBA and Gc levels, indicating possible Gc globulin involvement in bile acid transport. Patients with liver cirrhosis and those with metastatic liver disease showed significantly ($p<0.01$) lower serum Gc levels than did controls. Patients with CAH, without histologic evidence of established cirrhosis, had serum Gc levels significantly ($p<0.01$) higher than the control group (58.0 ± 6.0 versus 44.0 ± 6.0 mg/dl). When the biliary tract disease group was subdivided into patients with and without bone disease, all seven patients with severe bone disease were found to have significantly ($p<0.01$) lower serum Gc levels (27.0 ± 3.0 mg/dl) than did the controls. The authors suggest that low Gc values may decrease vitamin D_3 transport and so contribute to the osteodystrophy of obstructive liver disease.

7860 INCREASED FACTOR VIII COMPLEX AND DEFECTIVE RISTOCETIN-INDUCED PLATELET AGGREGATION IN LIVER DISEASE. (Eng.) Castillo, R.; Maragall, S.; Rodes, J.; Clemente, C.; Profitos, J.; Ordinas, A. (Hospital Clinico y Provincial, Barcelona, Spain). *Thromb. Res.* 11(6):899-906; 1977.

To elucidate the nature of hemostatic defects

in liver cirrhosis, levels of the factor VIII procoagulant activity (VIII:C), the factor VIII-related antigen (VIIIR:AG), and factor VIII von Willebrand activity (VIIIR:WF) were assayed in 23 patients with advanced cirrhosis and in normal subjects. In 12 of these patients, the Ristocetin-induced aggregation of washed platelets in the presence of normal platelet-poor plasma (PPP) was also studied; in 5/12 patients bovine factor VIII-induced aggregation was studied. In normal subjects, the average plasma VIII:C level was 91.66 ± 22.97 U/dl, while in cirrhotic patients it was 147.56 ± 103.74 U/dl. The mean value of VIIIR:AG was 90.26 ± 25.05 U/dl in normal subjects and 633.04 ± 259.79 U/dl in cirrhotic patients ($p<0.001$). The mean value of VIIIR:WF was 330.00 ± 215.00 U/dl in cirrhotic patients compared to 104.93 ± 12.38 U/dl in normal subjects. The degree of correlation between the three variables was high in normal subjects ($r\sim0.80$) but low in cirrhotic patients ($r\sim0.1$). The initial velocity of the Ristocetin-induced aggregation of washed platelets with normal PPP was diminished in each case compared to the results obtained with a control system of normal platelets containing the same number of platelets. The bovine factor VIII-induced platelet aggregation, however, was normal. These data confirm that, in cirrhotic patients, the factor VIII elevation is an increase of the whole protein, most likely caused by hepatic damage, not merely a raising of the procoagulant activity.

7861 THE ROLE OF THE FALSE NEUROTRANSMITTERS, OCTOPAMINE AND PHENYLETHANOLAMINE, IN HUMAN HEPATIC ENCEPHALOPATHY. (Eng.) Cangiano, C.; Calcaterra, V.; Cascino, A.; Fanelli, F. R.; Capocaccia, L. (III Clinica Medica, Policlinico Umberto I, Universita di Roma, Roma, Italy). *Rend. Gastroenterol.* 9(3):189-193; 1977.

To determine whether the accumulation of octopamine and phenylethanolamine (PEA) are involved in the etiology of hepatic encephalopathy, these false neurotransmitters were measured by a radioenzymatic assay in the plasma of healthy volunteers and in cirrhotic patients with and without encephalopathy. Octopamine levels were determined in plasma obtained from venous and arterial blood, whereas PEA was determined only in venous blood plasma. There were 23 normal subjects, 80 cirrhotic patients without liver coma, 27 cirrhotics who were in grades 1 or 2 hepatic coma, and 18 cirrhotics in grades 3 or 4 hepatic coma. Octopamine levels increased in the presence of chronic hepatic disease and at the onset and during the evolution of hepatic encephalopathy. In plasma from venous blood, the differences between the cirrhotic patients without coma and those in grade 1 or 2 hepatic coma ($p<0.005$) and between those in grade 1 or 2 and those in grade 3 or 4 coma ($p<0.001$) were statistically significant, whereas the difference between the healthy controls and the cirrhotic patients without coma was at the limit of the statistical difference ($0.1<p<0.05$). The octopamine level in plasma from arterial blood was significantly greater ($p<0.005$) in cirrhotic patients without coma than in the normal controls, but no other significant differences were seen. The mean arterial values of octopamine were higher than those of venous measurements in all groups except in patients in grades 3 or 4 hepatic coma. There was a good correlation between the venous PEA levels and the presence of liver cirrhosis and grade of hepatic coma. Differences between controls and cirrhotics without coma, between cirrhotics without coma and those with grades 1 or 2 coma, and between those with grades 1 or 2 coma and those with grades 3 or 4 coma were all significant ($p<0.05$, $p<0.05$, and $p<0.02$, resp.). There was a good correlation ($r=0.50$, $p<0.01$) between venous ammonia and octopamine levels in the 45 patients in whom these measurements were taken simultaneously. These data indicate that plasma PEA and octopamine levels increase in hepatic encephalopathy and that these increases are correlated with the intensity and evolution of the neurological disorders.

7862 HEPATIC ARTERIOPORTAL FISTULA RELATED TO A LIVER BIOPSY. (Eng.) Baer, J. W. (421 W. 113th St., New York, NY 10025). *Gastrointest. Radiol.* 2(3):297-299; 1977.

A patient with hepatic artery portal fistula presenting with bleeding esophageal varices 5 months following a liver biopsy for cirrhosis is presented. The patient was a 52-yr-old alcoholic man with previous evidence of cirrhosis and portal hypertension. A single pass with a 1.4-mm internal diameter Menghini needle was done. A sizeable portal vein was not identified in the specimen, although a portal triad and a central vein were seen. There were no immediate postbiopsy complications. Bleeding esophageal varices 5 months later were successfully treated with pitressin. A celiac arteriogram done in preparation for a mesocaval shunt showed an hepatic arterioportal vein fistula within the right lobe of the liver, enlarging the right branch of the portal vein. There was hepatopetal portal flow within the liver. The main portal vein as well as the branch to the left lobe of the liver were only visualized as a result of filling from the splenic vein on delayed films. The venous phase of the superior mesenteric arteriogram showed filling of the main portal vein, the branch to the left lobe, and the umbilical vein sequentially. An end-to-side portacaval shunt was performed since the intrahepatic portal vein was already "arteriolized," but the patient did poorly because of closure of the shunt.

7863 SMALL NODULAR LIVER CIRRHOSIS WITH MARKED PORTAL HYPERTENSION DUE TO VITAMIN A INTOXICATION RESULTING FROM PSORIASIS TREATMENT. (Ger.) Fleischmann, R.; Schlote, W.; Schomerus, H.; Wolburg, H.; Castrillon-Oberndorfer, W. L.; Hoensch, H. (Medizinische Universitatsklinik, Otfried-Muller-Strasse, 7400 Tubingen, W. Germany). *Dtsch. Med. Wochenschr.* 102(45):1637-1640; 1977.

A 36-yr-old man developed small nodular liver cirrhosis and marked portal hypertension with bleeding esophageal varices 3.5 yr after a 7-week treatment

with vitamin A (total dose 7 x 10^7 IU p.o., maximum daily dose 1.2 x 10^6 IU) for psoriasis vulgaris. There was no increase in the serum vitamin A level 3.5 yr after the treatment, but increased deposits of vitamin A were found in the perisinusoidal lipid storage cells (Ito cells) by fluorescence spectrophotometry and electron microscopy of the liver biopsy specimen. Thoracoabdominal subdiaphragmatic fundectomy, resection of the lower segment of the esophagus, splenectomy, proximal selective vagotomy, and pyloroplasty were performed. The patient is in good condition 2 months after surgery; the liver function tests are nearly normal.

7864 THYROID FUNCTION IN CIRRHOTIC PATIENTS: HORMONE BALANCE IN 24 PATIENTS WITH EDEMATOUS-ASCITIC DECOMPENSATION. (Fre.) Schmitt, B.; Amouretti, M. (Hopital Haut-Leveque, F 33604 Bordeaux Pessac, France). *Nouv. Presse Med.* 6(35): 3228-3229; 1977.

In 24 patients with cirrhosis accompanied by edematous ascites and decompensation, radioimmunoassays were performed for circulating 3,5',3'-triiodothyronine (T3r), 3,5,3'-triiodothyronine (T3), thyroxine (T4), free thyroxine (IT4), and thyroid-stimulating hormone (TSH). The values obtained were compared with established normal values. The levels of T3 were significantly lower ($p<0.001$) and the levels of T3r significantly higher ($p<0.001$) in the decompensated cirrhotic patients; no significant difference was observed in values for T4, IT4, or TSH. There appears to be an alteration in the conversion of T4 to T3 that causes an increase in peripheral T3r at the expense of T3. This hormonal modification is responsible for the symptoms of hypothyroidism observed in these cirrhotic patients. It is suggested that measurement of levels of T3 and T3r may be used as a means of surveillance of patients under treatment for decompensated cirrhosis.

7865 INTRAABDOMINAL BLEEDING FROM VARICEAL VESSELS IN CIRRHOSIS. (Eng.) Shapero, T. F.; Bourne, R. H.; Goodall, R. G. (Sunnybrook Medical Center, 2075 Bayview Ave., Toronto, Ontario, Canada). *Gastroenterology* 74(1):128-129; 1978.

The case of a cirrhotic patient who developed intraabdominal bleeding from variceal vessels is presented. The patient, a 39-yr-old alcoholic man, developed increased abdominal girth, abdominal pain, and stools positive for occult blood. At laparotomy, hemoperitoneum was present, and the bleeding was found to originate from variceal vessels in the peritoneum lateral to the ascending colon. Hemostasis was obtained with suturing, but the patient died postoperatively. Precipitous abdominal swelling associated with abdominal pain in a cirrhotic patient should alert the physician to the possibility of hemoperitoneum; it demands immediate paracentesis.

7866 DETERMINANTS OF ASCITIC FLUID PROTEIN IN CIRRHOSIS [Abstract]. (Eng.) Hoefs, J. (Dept. Medicine, Univ. Southern California, Los Angeles, CA). *Clin. Res.* 26(2):151A; 1978.

7867 HYDROCHLORIC ACID-INDUCED SECRETIN RELEASE, AND HALF-LIFE OF EXOGENOUS SECRETIN IN PATIENTS WITH LIVER CIRRHOSIS [Abstract]. (Eng.) Pelletier, M. J.; Chayvialle, J. A.; Descos, F.; Descos, L. (INSERM, U-45, Hopital Edouard-Herriot, 69374, Lyon, France). *Ir. J. Med. Sci.* 146(Suppl. 1):3; 1977.

7868 EFFECT OF AGE AND CIRRHOSIS ON THE DISTRIBUTION AND ELIMINATION OF CHLORDIAZEPOXIDE (LIBRIUM®) [Abstract]. (Eng.) Roberts, R. K.; Wilkinson, G. R.; Branch, R. A.; Schenker, S. (Vanderbilt Univ. Sch. Medicine, Nashville, TN). *Gastroenterology* 73(5):1243; 1977.

See also, 7481, 7487, 7494, 7495, 7506, 7782, 7788, 7797, 7831, 7845, 7877, 7905.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

7869 PROSPECTIVE STUDY OF THE FIRST 197 ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATICOGRAPHIES PERFORMED IN BASEL (1973-1975). (Ger.) Bernoulli, R.; Faust, H.; Gyr, K.; Thurnherr, N.; Aenishanslin, W.; Stalder, G. A. (Kantonsspital, CH-4004 Basel, Switzerland). *Schweiz. Med. Wochenschr.* 107(37):1287-1291; 1977.

The prospective evaluation of the first 197 endoscopic retrograde cholangiopancreaticographies (ERCP) performed in Basel during the 1973-1975 period is presented. It was possible to visualize the pancreatic duct, common bile duct, or both in 144/197 cases; the failure was due to the patient and/or instrument in 18/53 cases and to the examiner in 35. One hundred forty-two investigations were evaluable with respect to the definitive diagnosis. ERCP was correct in 101 cases, false in 10, and furnished

additional information in 31 cases. Acute pancreatitis, chronic pancreatitis, pancreatic pseudocysts, choledocholithiasis, carcinoma and sclerosis of the papilla, carcinoma and stenosis of the bile ducts, fistula of the cystic duct, Caroli's disease, hepatitis, liver cirrhosis, functional disorders, villous adenoma of the duodenum, and other diseases were the definitive diagnoses in the 101 cases that were correctly diagnosed by ERCP. The early complications of ERCP included one lethal sepsis in obstructive jaundice, aggravation of chronic recurrent pancreatitis in two cases, and abdominal complaints in five. Insufficient distinction between acute and chronic pancreatitis was the main cause of disagreement with the final diagnosis in the 10 discordant cases. It is difficult to differentiate between chronic pancreatitis and pancreatic carcinoma. The examiner failure showed a declining tendency as the experience of the examiner increased. The findings indicate that ERCP should be limited to regional hospital centers, and be performed only in cases with well-defined indications.

7870 THERAPEUTIC ENDOSCOPIC RETROGRADE CHOLANGIOGRAPHY. (Ger.) Safrany, L.; Kautz, G.; van Husen, N.; Weitemeyer, R. (Reinhard-Nieter-Krankenhaus, D-2940 Wilhelmshaven, W. Germany). *Langenbecks Arch. Chir.* 345:267-273; 1977.

The results of endoscopic papillotomy performed in 545 patients were evaluated. The papillotomy was successful in 516 patients; they included 405 patients with choledocholithiasis, 97 with organic papillary stenosis, 12 with tumors (carcinomas, papillomas, and adenomyomas) of the papilla, and 2 with stones of the pancreatic duct. The complications included hemorrhage in 11 cases, retroperitoneal perforation in 10, pancreatitis in 6, cholangitis with incarcerated stone in 11, and incarceration of the Dormia cage in 2; laparotomy was necessary in 11 of these 38 patients. The mortality of the endoscopic papillotomy was 5/545; 4 patients died from cholangitis and 1 from pancreatitis. Advanced age, poor general condition, cholangitis, chronic pancreatitis, juxtapapillary diverticulum, and past Billroth II gastric resection are not contraindications of endoscopic papillotomy. It is becoming increasingly evident that endoscopic papillotomy is a valid alternative to reoperation in many cases of choledocholithiasis.

7871 A COMPARISON OF INTRAVENOUS AND INFUSION CHOLANGIOGRAPHY WITH INTRAOPERATIVE AND TOMOCHOLANGIOGRAPHY. (Ger.) Grauthoff, H.; Thelen, M.; Peters, M. (Radiologische Universitatsklinik, 5300 Bonn-Venusberg, W. Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 127(6):575-577; 1977.

The diagnostic value of preoperative i.v. or infusion cholangiography (IC), intraoperative cholangiography (IOC), and additional tomocholangiography (TC) was studied in 72 patients with papillary stenosis (38), choledocholithiasis (16), and prepapillary stones (20). The intraoperative diagnosis of papillary stenosis was confirmed in 33/38 cases by IOC, in 28/38 cases by IC, and in 19/24 cases by TC. Choledocholithiasis was correctly diagnosed in 13/16 cases by IC, in 9/11 cases by TC, and in 9/16 cases by IOC. Papillary stenosis was diagnosed correctly in 15/20 cases by IC, in 9/16 cases by TC, and in 16/20 cases by IOC. The findings indicate that stenosis of the papilla is diagnosed most reliably by IOC. Intravenous and infusion cholangiography were of equal value; they each provided less information than did the intraoperative examination. IC was significantly better for the diagnosis of choledocholithiasis than was IOC, and tomography furnished no additional information. Stones of papilla are diagnosed most reliably by IOC, while preoperative TC resulted in a loss of information.

7872 INDICATIONS FOR ENDOSCOPIC PAPILLOTOMY. (Eng.) Classen, M.; Ossenberg, F. W. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 228-231; 1977.

Current knowledge concerning the indications for endoscopic papillotomy is reviewed, and the authors' experience with this procedure is presented. A benign papillary stenosis was removed or at least improved by this procedure in all 10 patients in whom it was performed. Common duct stones were removed completely in 86% of 85 patients. Severe complications were observed in 5.6% of the patients who underwent endoscopic papillotomy. Although none died, a mortality rate of 1-1.5% has been suggested by other studies. The use of endoscopic papillotomy in the treatment of isolated papillary stenosis should be limited to cases in which the following have been demonstrated: clinical signs and laboratory diagnostics of cholestasis, radiological demonstration of enlarged extra- and intrahepatic bile ducts, and increased duodenobiliary pressure gradient. The indications for the endoscopic removal of common duct stones are (1) retained or recurrent common duct stones after preceding operations or (2) patients who are high operative risks.

7873 BILIARY BACTERIOLOGY BASED ON INTRAOPERATIVE BILE CULTURES. (Eng.) Delikaris, P. G.; Michail, P. O.; Klonis, G. D.; Haritopoulos, N. C.; Golematis, B. C.; Dreiling, D. A. (First Dept. Surgery, Univ. Athens, 66 Ipirou St., Athens 109, Greece). *Am. J. Gastroenterol.* 68(1):51-55; 1977.

Bile cultures taken during 174 extrahepatic biliary tract operations were studied to examine the role of bacteria in postoperative infections and the factors involved in the development of septic complications. There were 45 positive bile cultures (26%). *Escherichia coli* was the most common organism, and was recovered in 21 cases; *Klebsiella* was second in frequency, being found in 13 cultures. There was no sex predominance in the positive bile culture group, there being 22

men and 23 women. There was an increasing percentage of positive bile cultures with advancing age, regardless of the underlying disease. The highest incidence of positive bile cultures occurred in patients with acute cholecystitis (9/9 cases), as compared with the incidence in cholestasis (16/46) or with noncholestatic patients (20/119). Septic complications in the patients with a negative bile culture were rare (1.5%), whereas the rate among the patients with a positive culture was 33.3%. Since septic complications must be the result of intraoperative contamination from the infected bile, an argument is presented for prophylactic preoperative antibiotic administration as well as for routine culture of bile at the time of surgery.

7874 ERCP IN THE DIAGNOSIS AND MANAGEMENT OF PERIAMPULLARY CARCINOMA. (Eng.) Salmon, P. R.; Rey, J. F.; Baddeley, H.; Schiller, K. F. R.; Davies, J.; MacKenzie, E.; Read, A. E. *In: The Sphincter of Oddi. Proceedings of the Third Gastroenterological Symposium, Nice, June 8-9, 1976.* (Basel: S. Karger): 111-114; 1977.

Experience with endoscopic retrograde cholangiopancreatography (ERCP) in the diagnosis of periampullary carcinoma is presented. Among 535 patients who underwent diagnostic ERCP between 1971 and 1976, 14 patients were diagnosed as having carcinoma, and this was confirmed in 11. Nine of the 11 patients had symptoms less than 3 months, 5 less than 4 weeks, and 2 less than 2 weeks. In addition, nine presented with jaundice. These facts suggest that the prognosis should be good since an early diagnosis is possible. In all cases the papillary and periampullary region were abnormal, the papilla being enlarged and the site of an apparent malignant tumor. Five tumors were ulcerated. Pancreaticoduodenectomy was performed in three patients, all of whom are alive. The survival period was short (average, 8.5 weeks) in cases in which an internal bypass procedure was performed.

7875 A NEW ENDOPROSTHESIS FOR NONOPERATIVE INTUBATION OF THE BILIARY TRACT IN MALIGNANT OBSTRUCTIVE JAUNDICE. (Eng.) Burcharth, F. (Gentofte Hosp., Copenhagen, Denmark). *Surg. Gynecol. Obstet.* 146(1):76-78; 1978.

A new, previously described method for percutaneous transhepatic intubation under local anesthesia was investigated in 19 patients having inoperable biliary tract tumors or presenting as prohibitively high operative risks. The method is carried out following diagnostic percutaneous transhepatic cholangiography, and involves the insertion of an endoprosthesis under fluoroscopic control. A guidewire is passed from a punctured peripheral biliary duct into the biliary tract and manipulated past the obstruction into the duodenum. The endoprosthesis, a radiopaque polyethylene catheter with side holes, is pushed forward through the obstruction with an introducer until the distal end is below the obstruction and the proximal end is in the biliary tree above the obstruction. The introducer is connected to a catheter bag and left in the biliary tree for external drainage of bile. Twelve patients had inoperable malignancies, and their obstructive jaundice was treated palliatively with the endoprosthesis. Jaundice disappeared after 2 weeks in nine patients and decreased in five. Among the seven patients who underwent surgery, four still had jaundice when the operation was performed. In six patients with unresectable periampullary tumors, intubation was attempted but proved to be impossible due to advanced stenosis of the tumor. No patient showed signs of cholangitis, bile peritonitis, or bleeding. The median survival time in the 12 patients exclusively treated with endoprosthesis was 61 days. In all patients, jaundice recurred approximately 1 month before death. At autopsy, neither cholascos nor gallstones were found, and all endoprostheses were in the correct position and without sludge obstruction. With extended experience, the endoprosthesis may prove to be a worthwhile alternative to biliodigestive anastomoses in selected patients.

7876 RHABDOMYOSARCOMA OF THE BILE DUCTS. (Eng.) Nagaraj, H. S.; Kmetz, D. R.; Leitner, C. (Univ. Louisville Sch. Medicine, Louisville, KY 40201). *J. Pediatr. Surg.* 12(6):1071-1074; 1977.

The case of a child with a rhabdomyosarcoma of the bile ducts is presented. The patient, a 4.5-yr-old boy, had recurrent jaundice, fever, abdominal pain, and hepatomegaly. Ultrasonography of the liver disclosed hepatomegaly with probable dilatation of bile ducts. Two avascular areas close to the porta hepatis were demonstrated on selective celiac arteriography. An operative cholangiogram showed a small cystic duct and a dilated common duct that readily emptied into the duodenum. However, no dye could be refluxed into the proximal duct. Several soft yellow-tan polypoid masses were found in the common duct. The major portion of the tumor arose from the common hepatic duct, and the common duct, common hepatic duct, gallbladder, and cystic duct were resected. Ultrastructural examination of the tumor disclosed immature skeletal muscle fibers, exhibiting myofibril formation. A liver biopsy specimen showed biliary cirrhosis and was free of tumor. The distal part of the common bile duct was tumor-free. The patient has had no evidence of tumor or local recurrence for the past 9 months, during which time he has received alternate doses of vincristine and actinomycin D.

7877 SCLEROSING CHOLANGITIS AND PRIMARY BILIARY CIRRHOSIS--A DISEASE SPECTRUM? (Eng.) Fee, H. J.; Gewirtz, H.; Schiller, J.; Longmire, W. P., Jr. (Univ. California Los Angeles Sch. Medicine, Los Angeles, CA). *Ann. Surg.* 186(5):589-593; 1977.

A study was made retrospectively of 21 patients with primary sclerosing cholangitis (PSC) and 14 with primary biliary cirrhosis (PBC) in which there was absence of choledocholithiasis, previous bile

duct surgery, malignancy, or cholestatic jaundice from drug or viral hepatitis and presence of progressive obstructive jaundice and of thickening and fibrosis in the affected intra- or extrahepatic system. The average age of onset was 40-50 yr in men and 20-40 yr in women with PSC and 50 yr in men and 40-60 yr in women with PBC. The major presenting complaints were jaundice and pruritus in PSC and pruritus, jaundice, abdominal pain, and lethargy in PBC. There were 47% and 21% men with PSC and PBC, resp., in this series. Laboratory findings in both diseases are similar: bilirubin and alkaline phosphatase levels are elevated (markedly in PSC and moderately in PBC), cholesterol levels were elevated in many patients, and eosinophilia was noted (in 7/21 PSC and 3/14 PBC patients). The distinction between PSC and PBC is often difficult; PSC had a slightly higher incidence of associated autoimmune disease, a greater hyperbilirubinemia (usually mixed), a more marked incidence of eosinophilia, and a more pronounced hypercholesterolemia. Of the 21 PSC patients, 3 had thyroiditis, 3 had ulcerative colitis, 1 had granulomatous colitis, and 6 had xanthomata; of the 14 with PBC, 1 had Hashimoto's thyroiditis, 2 had idiopathic myopathies, 1 had retroperitoneal fibrosis, and 1 had xanthalasma. Six of the 21 patients with PSC had associated, histologically proven PBC as well. Choleretics and cholestyramine were more effective than steroids or immuran in treatment. Treatment by T-tube drainage involved a considerable risk of infection, so that cholangitis was a frequent cause of morbidity. The prognosis of both PSC and PBC is usually grave and life expectancy difficult to determine; survival time did not correlate with initial laboratory findings or associated diseases. The mean time from symptoms to death was 9.5 yr and 2.5 yr in PBC and PSC, resp., and the causes of death were hepatic failure (4 in PBC, 3 in PSC), hepatorenal syndrome (1 in each disease), pericarditis (1 in PSC), cerebrovascular accident (1 in PSC), ascending cholangitis (1 in PSC), and unknown (1 in PBC). Etiologically, no organism was consistently found in the bile, and several samples were sterile. These two diseases may represent varying degrees of response to a common etiological agent.

7878 ABSORPTION AND METABOLISM OF CHENODEOXYCHOLIC ACID IN MAN. (Eng.) v. Berge-Henegouwen, G. P.; Hofmann, A. F.; Thistle, J. L.; Schalm, S. W.; Cowen, A. E. *In: Bile Acid Metabolism in Health and Disease. Proceedings of the IV Bile Acid Meeting held at the Hilton Hotel, Basel, Switzerland, October 11-12, 1976.* (Baltimore: University Park Press): 157-159; 1977.

The pharmacokinetics of chenodeoxycholic acid were studied in healthy volunteers and in gallstone patients on regular chenodeoxycholic acid therapy. Intraduodenally instilled solutions of chenodeoxycholate were absorbed completely at loads varying from 25 to 400 mg in a 50-cm segment of jejunum. By gas-liquid chromatography, the concentration of unconjugated chenic acid in peripheral blood rose to a peak (10-50 μM) within 10 min. Chenic acid was also absorbed completely when administered p.o. Hepatic chenic acid clearance was constant for doses from 25 to 400 mg. First-pass hepatic clearance of chenic acid averaged 62% and was considerably greater for chenyl conjugates. Chenic acid appeared in peripheral blood in the unconjugated form; it was rapidly conjugated in the liver and excreted into bile.

7879 DISSOLUTION OF GALLSTONES LEFT IN THE COMMON BILE DUCT. (Ger.) Thiele, H. (Chirurgische Klinik, Klinikum Mannheim, Theodor-Kutzer-Ufer, D-6800 Mannheim-1, W. Germany). *Langenbecks Arch. Chir.* 344(2):123-129; 1977.

Conservative methods were used to remove residual gallstones from the common bile duct after cholecystectomy and inspection of the common bile duct in eight women aged 30-73 yr. Heparin infusion was used to dissolve the gallstones in six patients: complete dissolution was achieved in three cases, the dissolution of the stone was probable but not proved in one case, and the heparin infusion treatment was unsuccessful in two cases. Gallstones with high cholesterol content were dissolved most easily. The gallstones were dissolved successfully in one patient by means of an ether-chloroform mixture, but the treatment had to be stopped because of rausch. Treatment with heparin and sodium cholate was unsuccessful in one patient. In case of failure, the stones were removed at relaparotomy.

7880 STONE DISSOLUTION AND THE NATIONAL COOPERATIVE GALLSTONE STUDY. (Eng.) Schoenfield, L. J. (Cedars-Sinai Medical Center, 8700 Beverly Blvd., Los Angeles, CA 90048). *Am. J. Dig. Dis.* 22(12):1115-1116; 1977.

A progress report of the National Cooperative Gallstone Study (NCGS) is presented. The NCGS is a randomized, controlled, double-blind, cooperative, clinical trial in which the primary aim is to determine the efficacy and safety of chenodeoxycholic acid (CDC) in gallstone dissolution. Its secondary aims are to identify specific determinants of efficacy and safety, study the frequency and management of recurrence after dissolution, and investigate relevant basic mechanisms. Accession of patients to the initial (liver biopsy) study was completed in 1976, at which time the main clinical study was initiated with Food and Drug Administration approval. This study includes 100 patients randomized to receive either 375 or 750 mg/day of CDC. These patients will undergo pre- and post-treatment liver biopsies in addition to the same frequent clinical and laboratory patient safety monitoring procedures of the main study. In the main study, 900 patients will be randomized to receive either 375 or 750 mg/day of CDC or placebo. So far, about 500 patients have entered the main study. The NCGS, under careful scrutiny, is progressing satisfactorily toward definitive conclusions regarding the efficacy and safety of CDC.

7881 EFFECT OF INCREASED DIETARY FIBER ON BILIARY CHOLESTEROL IN PATIENTS WITH GALLSTONES. (Eng.) McDougall, R. M.; Walker, K.; Thurston, O. G. (Univ. Alberta Hosp., Edmonton, Alberta, Canada). *Surg. Forum* 28:416-418; 1977.

To study the underlying mechanisms in cholesterol cholelithiasis, the effect of increased dietary fiber in the form of bran on biliary lipids, bile acid pool size, and individual bile acid ratios was studied in seven patients with radiolucent gallstones in a functioning gallbladder and in nine healthy volunteers. Bile specimens were collected before and after a 4-week period, during which the subjects ate 50 g of a bran cereal daily in one or two servings. Initially, bile was supersaturated with cholesterol in the seven patients and became unsaturated in all seven with increased dietary fiber ($p<0.02$). In controls, bile was unsaturated with cholesterol before and after bran. The total bile acid pool was reduced in gallstone patients as compared with that in controls and did not change in either group with bran (mean pool sizes, 1.66 versus 2.51 g; $p<0.05$). The proportion of deoxycholic acid in the bile acid pool was increased initially in patients with gallstones in comparison with controls (mean 32.0 versus 19.0%; $p<0.05$). The proportion of the bile acid pool formed by deoxycholic acid declined in both groups with bran (gallstones, 32.0% to 22.9%; controls, 19.0% to 17.0%; $p<0.05$ for the two groups combined). The data indicate that increased dietary fiber in patients with gallstones causes the return to an unsaturated state of bile supersaturated with cholesterol. These data suggest that the reduced bile acid pool size seen in gallstone patients may be due to impaired gallbladder function or bile displacement by stones, since reduced pool size could be restored in the patients with gallstones by hepatic bile acid synthesis.

7882 ACUTE NON-CALCULOUS CHOLECYSTITIS IN BURNS. (Eng.) Alawneh, I. (Stadt. Krankenhause, Paracelsusstrasse 1-9, 3320 Salzgitter-Bad 51, W. Germany). *Br. J. Surg.* 65(4):243-245; 1978.

Seven burned patients who developed acute cholecystitis were studied. The time of onset of symptoms varied between 10 and 37 days after the injury. Jaundice was present in five patients, and bile cultures were positive in six patients. There were six men and one woman; five patients were 28 to 40 yr old, and the other two were 56 and 69 yr. Cholecystectomy was performed in all patients, and one patient died. It is suggested that the cause of post-burn cholecystitis is traumatic and septic shock, with consequent biliary stasis.

7883 CHOLESTASIS ASSOCIATED WITH CENTRAL INTRAVENOUS NUTRITION IN INFANTS. (Eng.) Brown, M. R.; Putnam, T. C. (Genesee Hosp., 224 Alexander St., Rochester, NY 10467). *N.Y. State J. Med.* 78(1):27-30; 1978.

The case reports of two infants who developed severe intrahepatic cholestasis during central intravenous nutrition are presented. The first infant underwent a 20-cm ileal resection for atresia with meconium peritonitis (day 1 of life) but developed necrotizing enterocolitis by day 18. The second infant (1 kg; premature) did well until massive resection of the small intestine was required on day 37 of life for necrotizing enterocolitis. The first infant developed elevated levels of peripheral eosinophils, alkaline phosphatase, and bilirubin. Despite a change to p.o. diet, the bilirubin level increased, stools became acholic, tyrosine and then methionine levels became elevated, and biopsy revealed hepatocellular and canalicular cholestasis. He did not respond to phenobarbital (5 mg/kg/day for 1 week) or to cholestyramine (1 g/day) plus prednisone (5 mg/day) between day 57 and the 4th month of life, at which time the stools gradually became yellow and liver function tests returned to normal. During his 5th month, severe respiratory problems arose and he continued to have asthma and other allergic symptoms. The second infant had *Klebsiella* and *Candida* in tracheal aspirates before the institution of parenteral nutrition. When the liver and spleen became enlarged, p.o. feeding was reinstituted, but the patient developed recurrent apnea, persistent acidosis, hemolytic anemia, cardiovascular arrests, and elevated methionine and tyrosine levels. Phenobarbital (5 mg/kg, i.m.) did not lower the bilirubin level, and cholestyramine administration caused diarrhea. The infant died of cardiorespiratory arrest, and autopsy revealed micronodular cirrhosis with significant cholestasis and abnormalities in the lungs, brain, and kidneys. Cholestasis associated with parenteral nutrition in infants is probably multifactorial. Drug toxicity, bacterial toxicity, amino acid toxicity, and lack of bile flow stimulation may be possible causes.

7884 ENTEROBILIARY FISTULA AND ERCP. (Eng.) Ghazi, A. (Beth Israel Medical Center, 10 Nathan D. Perlman Pl., New York, NY 10003). *Am. J. Gastroenterol.* 68(1):81-83; 1977.

A case of ascending cholangitis with a patent enterobiliary fistula in which endoscopic retrograde cholangiopancreatography (ERCP) gave useful diagnostic information is presented. The patient was a 60-yr-old woman who presented with right upper quadrant abdominal pain, nausea, vomiting, fever, and chills for 1 week. She had undergone gallbladder surgery 15 yr previously. Physical examination revealed a palpable right upper quadrant mass and jaundice. Gastrointestinal series revealed that no contrast material entered the biliary tract under fluoroscopic control, but lateral overhead films showed opacification of the biliary tree that revealed a common bile duct dilated to 1.5 cm. The cystic duct and gallbladder did not visualize. No calculi were demonstrated in the common bile duct. ERCP was carried out after the serum bilirubin level had increased from 1.4 mg% to 4 mg% and revealed an enterobiliary fistula with an opening located in the proximal portion of the second part of the duodenum. Cannulation

through this opening revealed a common bile duct dilated to 2.5 cm, which contained several large calculi. The cystic duct and gallbladder again did not visualize. Exploratory laparotomy showed acute cholecystitis, cholelithiasis, choledocholithiasis, and choledochoduodenal fistula. A cholecystectomy was carried out, and all calculi were removed from the common bile duct. The T-tube was left in place. The patient made an uneventful recovery. The presence of air in the biliary system is not definite evidence of a well-functioning fistula and does not rule out intraductal biliary pathology. Demonstration of a fistula by barium reflux into the fistula's tract does not necessarily mean that all the pathology that is present within the ductal system has been demonstrated. Hence, ERCP is a useful diagnostic tool.

7885 HEPATOSPLENIC SCINTIGRAPHY IN CHILDREN WITH OBSTRUCTIVE JAUNDICE. (Eng.) DaCosta, H.; Gandhi, R.; Deshmukh, S.; Puri, K.; Loken, M. (B.A.R.C. and K.E.M. Hosp., Parel, Bombay, India). *Clin. Nucl. Med.* 2(11):381-385; 1977.

Experience using hepatosplenic scintigraphy in 36 children with obstructive jaundice is summarized. Of 11 patients with extrahepatic biliary obstruction, all had choledochal cysts and three also exhibited extrinsic biliary atresia. Liver scans in patients with choledochal cysts showed less than normal radiocolloid radioactivity in the region of the porta hepatis. This finding persisted whether the cysts were palpable or nonpalpable. The left hepatic lobe tended to be prominent in this group of patients, such that the spleen was frequently indecipherable on radiocolloid scans from the abutting left lobe of the liver. ^{131}I-rose bengal (RB) studies were carried out in children suspected of either biliary atresia or choledochal cysts as suggested by the radiocolloid scintiphotographs. Only in two patients was the initially nonradioactive portal region subsequently seen to contain ^{131}I-RB; in both cases, this change was first noticed in the 7-hr scintiphotogram, suggesting that the zone was being gradually filled during the excretory phase and that the abnormality was located along the tract of the common bile duct. No choledochal cyst accumulated RB. The authors stress the necessity for correlation between clinical, laboratory, radiological, and scintigraphic findings.

7886 OBSTRUCTIVE JAUNDICE CAUSED BY HETEROTOPIC PANCREATIC TISSUE IN THE AMPULLA OF VATER. (Ger.) Hocht, B.; Kuhner, U.; Gay, B.; Arbogast, R. (Chirurgische Universitatsklinik, Josef-Schneider-Str. 2, 8700 Wurzburg, W. Germany). *Z. Kinderchir.* 22(1):79-82; 1977.

Obstructive jaundice due to heterotopic pancreatic tissue in the ampulla of Vater was diagnosed in a 2.75-yr-old girl. Transduodenal sphincterotomy was performed following initial conservative treatment. The patient recovered well. Ten months after surgery, transient signs of obstructive jaundice and pancreatitis appeared; they resolved quickly on conservative treatment. The patient has been symptom-free for 3.5 yr after surgery.

7887 COURVOISIER'S GALLBLADDER IN CALCULOUS CHOLEDOCHAL OBSTRUCTION: ULTRASOUND AND ^{111}In-PHENOLPHTHALEXON STUDIES. (Eng.) Lin, M. S.; Zatz, L. M.; Kosek, J. C.; Taylor, K. B. (Veterans Admin. Hosp., 3801 Miranda Ave., Palo Alto, CA 94304). *Clin. Nucl. Med.* 2(11):386-388; 1977.

The case of a patient with a distended gallbladder and calculous choledochal obstruction is presented. The patient was a 65-yr-old man who had previously undergone a portacaval shunt operation for decompensated liver cirrhosis and a Billroth II anastomosis for peptic ulcer disease. The patient presented with gastrointestinal bleeding due to an anastomotic ulcer, which was oversewn; a bilateral truncal vagotomy was carried out at this time. Following surgery, the patient developed progressive hyperbilirubinemia. Gray scale ultrasonography and biliary scanning using ^{111}In-phenolphthalexon demonstrated an enlarged gallbladder, suggesting an extrahepatic component in the cholestasis. Analysis of the ^{111}In excreted in a series of fecal specimens showed a wide variation from high-activity dark feces to low-activity pale ones, compatible with an intermittent choledochal patency suggestive of calculous obstruction. At autopsy, a 950-g cirrhotic liver (postnecrotic), a dilated common bile duct obstructed by a faceted juxta-ampullary stone, and an unobstructed, dilated gallbladder containing stones and showing changes of chronic cholecystitis (mural fibrosis) were found. This case violates Courvoisier's law, which states that an enlarged gallbladder usually indicates a neoplastic extrahepatic obstruction.

7888 SPONTANEOUS PERFORATION OF THE COMMON BILE DUCT. (Eng.) Lipinski, J. K.; Gouws, F.; Donald, J. C. (1105 Pandora Ave., 220, Victoria, British Columbia, Canada). *Ann. Surg.* 43(10):656-659; 1977.

Two cases of spontaneous perforation of the common bile duct are presented, and cases in the literature are reviewed. The first patient, an 86-yr-old woman, presented with acute midabdominal pain, distention, and bilious vomiting. There was marked tenderness in the right lower quadrant with rebound tenderness. Bowel sounds were absent. A clinical diagnosis of peritonitis from a ruptured viscus was made, and at laparotomy, bile peritonitis was seen. Most of the bile-stained fluid was in the upper abdomen with some inflammatory reaction in the area of the gallbladder and Hartmann's pouch. The gallbladder was full of stones, with a stone impacted in the area of the cystic duct. Dissection was carried out in the area of the triangle of Calot and along the common duct. A 5-mm free perforation of the common bile duct was found. There was no evidence of stones in the common duct. Following cholecystectomy, a T-tube cholangiogram did not reveal obstruction or common duct stones. The second patient was an 83-yr-old woman who presented with anorexia, vomiting, and

dehydration. Marked right upper quadrant tenderness was present, and rectal examination revealed some acholic stool. Plain abdominal films showed multiple loops of small and large bowel with several air-fluid levels. At laparotomy, a large quantity of thick bile-stained fluid was noted. The gallbladder was thin-walled and covered with a fibrinous exudate but was otherwise normal. Fresh bile was pouring from a tear in the common duct above the junction of the cystic and common hepatic ducts. There was no evidence of calculi or neoplasm. A catheter was placed in the common duct and a sump drain inserted into the subhepatic area and into the foramen of Winslow and brought out through the abdominal wall. Both patients recovered following drainage of the duct and the surrounding area. The results of drainage in these patients and in other patients with common bile duct perforation reported in the literature have been gratifying.

7889 NECROTIZING VASCULITIS OF THE GALLBLADDER AND THE APPENDIX: SIMILARITY IN THE MORPHOLOGY OF RHEUMATOID ARTERITIS AND POLYARTERITIS NODOSA. (Eng.) Fayemi, A. O.; Ali, M.; Braun, E. V. (Holy Name Hosp., Teaneck Rd., Teaneck, NJ 07666). *Am. J. Gastroenterol.* 67(6):608-612; 1977.

The cases of two patients, one with rheumatoid arthritis (RA) and the other with polyarteritis nodosa (PN), who developed abdominal pain secondary to necrotizing vasculitis of the gallbladder and the appendix, resp., are described. The first patient was a 61-yr-old man who had been maintained on corticosteroids and butazolidin for RA for 3 yr. Abdominal pain in this patient was associated with nausea and fever. A nonvisualizing gallbladder was noted on p.o. cholecystography, and a diagnosis of chronic cholecystitis was made. Cholecystectomy was performed. The gallbladder contained viscid greenish bile and 15 strawberry stones. Microscopically, the mucosa and submucosa of this organ showed edema and sparse lymphocytic infiltrate. The walls of the vessels showed focal fibrinoid necrosis and infiltration of all layers of the wall by chronic inflammacory cells. Intimal thickening with luminal narrowing and, rarely, thrombosis were found. There was fragmentation of the elastic laminas. The patient died 3 days after surgery, after developing vomiting, diarrhea, shock, oliguria, and a temperature of 40.5 C. The second patient was a 48-yr-old man who developed acute abdominal pain on the 20th day of hospitalization for progressive weakness; he had been treated for joint swelling and pain, which had been diagnosed as gout. The patient was explored surgically for suspected appendicitis, and appendectomy was performed. Microscopically, the appendiceal lumen was partially obliterated by fibrous tissue. There were no acute inflammatory changes within the wall. The blood vessels showed fibrinoid necrosis of varying severity. The entire thickness of the vessels was infiltrated by chronic inflammatory cells containing many eosinophils. The lesions were of different ages, the wall of some vessels having been replaced by acellular fibrous tissue. Recanalized thrombi were evident in some arteries, and the elastic laminas were frequently fragmented. These cases illustrate the similarity between the vascular lesions of PN and RA.

7890 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY PRIOR TO RETROGRADE CHOLANGIOGRAPHY [Letter to Editor]? (Fre.) Elewaut, A.; Hendrix, R.; Hoste, P.; Barbier, F. (Akademisch Ziekenhuis, De Pintelaan 135, B-9000 Gand, Belgium). *Nouv. Presse Med.* 6(31): 2776-2777; 1977.

7891 COMMON BILE DUCT OBSTRUCTION SECONDARY TO INFECTION WITH Candida. (Eng.) Marcucci, R. A.; Whitely, H.; Armstrong, D. (Hines Veterans Admin. Hosp., Hines, IL 60141). *J. Clin. Microbiol.* 7(5):490-492; 1978.

7892 DIRECT ENDOSCOPIC VISUALIZATION OF THE BILE AND PANCREATIC DUCT SYSTEMS BY PER-ORAL CHOLANGIOPANCREATOSCOPY (PCPS). (Eng.) Nakajima, M.; Akasaka, Y.; Yamaguchi, K.; Fujimoto, S.; Kawai, K. (Kyoto Prefectural Univ. Medicine, Kawaramachi-Hirokoji, Kamigyo-Ku, Kyoto 602, Japan). *Gastrointest. Endosc.* 24(4):141-145; 1978.

7893 TYPE I HISTIOCYTOSIS X PRESENTING AS BILIARY ATRESIA: A CASE REPORT. (Eng.) Heitner, R.; Mouton, S.; Rabinowitz, L.; Rosen, E. U. (Baragwanath Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 53(19):768-770; 1978.

7894 TREATMENT OF CHOLESTEROL GALLSTONES WITH CHENIC ACID: A FOLLOW-UP STUDY OF 25 PATIENTS. (Eng.) Beker, S. (Escuela de Medicina Luis Razetti, Universidad Central de Venezuela, Caracas, Venezuela). *Am. J. Gastroenterol.* 68(5): 456-460; 1977.

7895 INTRAVENOUS CHOLANGIOGRAPHY IN THE DIAGNOSIS OF ACUTE CHOLECYSTITIS. (Eng.) Cheung, L. Y.; Chang, F. C. (Dept. Surgery, Washington Univ., 4960 Audubon Ave., St. Louis, MO 63110). *Arch. Surg.* 113(5):568-570; 1978.

7896 SERUM LEVELS OF CHENODEOXYCHOLIC ACID IN HEALTH AND NON-HEPATIC DISEASE: RELATIONSHIP WITH CHOLELITHIASIS. (Eng.) Schalm, S. W. (Academic Hosp. Dijkzigt, Rotterdam, Netherlands). *Acta Gastroenterol. Belg.* 40(11/12):406-407; 1977.

7897 GRANULAR CELL MYOBLASTOMA: A CAUSE OF BILIARY OBSTRUCTION. (Eng.) Zvargulis, J. E.; Keating, J. P.; Askin, F. B.; Ternberg, J. L. (St. Louis Children's Hosp., 500 S. Kingshighway, St. Louis, MO 63110). *Am. J. Dis. Child.* 132(1): 68-70; 1978.

7898 TOTAL EXCISION OF CHOLEDOCHAL CYST. (Eng.) Lilly, J. R. (Univ. Colorado Sch. Medicine,

Denver, CO). *Surg. Gynecol. Obstet.* 146(2):254-256; 1978.

7899 SURGICAL TREATMENT OF ACUTE CHOLECYSTITIS. (Eng.) Ram, M. D.; Bergese, J.; Brown, H. W. (Huron Road Hosp., Cleveland, OH 44112). *Am. Surg.* 43(11):763-767; 1977.

7900 PRIMARY SCLEROSING CHOLANGITIS. (Eng.) Yague, S. (San Juan de la Cruz Hosp., Ubeda, Jaen, Spain). *Abdom. Surg.* 19(6):136-137; 1977.

7901 THE CASE OF THE COMMON DUCT CANCER. (Eng.) Seaman, W. B. (Columbia-Presbyterian Medical Center, New York, NY). *Hosp. Pract.* 12(12):55-56; 1977.

7902 RE-OPERATION OF THE CHOLEDOCHAL CYST. (Eng.) Nakamura, S.; Kimura, S.; Ishidoya, T.; Tamaki, Y. (Ehime Univ., Sch. Medicine, Shigenobucho, Onsengun, Ehime, Japan). *Z. Kinderchir.* 22(1):41-50; 1977.

7903 GALLSTONE DISEASE PRESENTING AS SEPTICAEMIC SHOCK. (Eng.) Faber, R. G.; Ibrahim, S. Z.; Thomas, D. M.; Beynon, G. P. J.; Le Quesne, L. P. (Middlesex Hosp. and Medical Sch., London, England). *Br. J. Surg.* 65(2):101-105; 1978.

7904 PRECURSORS FOR BILIARY STEROLS IN MAN [Abstract]. (Eng.) Lindblad, L.; Schersten, T. (Sahlgrenska Sjukhuset, Univ. Goteborg, Goteborg, Sweden). *Digestion* 16(4):344; 1977.

7905 ^{14}C-CHOLIC ACID TEST IN HEPATOBILARY DISEASE [Abstract]. (Eng.) Horak, W.; Knoflach, P.; Schuster, E.; Kemenesi, W. (Dept. Gastroenterology, Univ. Vienna, Vienna, Austria). *Digestion* 16(4):324-325; 1977.

7906 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY [Abstract]. (Eng.) Tytgat, G. (No affiliation given). *Scand. J. Gastroenterol.* 12 (Suppl. 47):27-28; 1977.

7907 RISK OF ORAL AND INTRAVENOUS CHOLANGIOGRAPHY [Abstract]. (Eng.) Hafter, E. (No affiliation given). *Scand. J. Gastroenterol.* 12(Suppl. 47):24-25; 1977.

7908 ULTRASONIC DIAGNOSIS OF CHOLELITHIASIS. (Eng.) Holt, R. W.; Wagner, R.; Homa, M. (Georgetown Univ. Medical Center, Washington, DC). *J. Pediatr.* 92(3):418-419; 1978.

7909 CANCER OF THE UPPER BILIARY JUNCTION. (Eng.) Salembier, Y. (69, rue de la Louviere, 59000 Lille, France). *Int. Surg.* 62 (11/12):616-618; 1977.

7910 ENDOSCOPIC PAPILLOTOMY AND REMOVAL OF GALLSTONES. (Eng.) Demling, L. (Univ. Clinic, Erlangen, W. Germany). *J. R. Coll. Surg. Edinb.* 22(6):385-390; 1977.

See also, 7401, 7412, 7415, 7466, 7484, 7486, 7489, 7500, 7501, 7769, 7781, 7782, 7796, 7804, 7806, 7859, 7860, 7943, 7958.

GENERAL

7911 ENDOSCOPIC CONTROL OF MASSIVE UPPER GASTROINTESTINAL BLEEDING WITH A TISSUE ADHESIVE (MBR 4197). (Eng.) Martin, T. R.; Onstad, G. R.; Silvis, S. E. (Veterans Admin. Hosp., 54th St. and 48th Ave. South, Minneapolis, MN 55417). *Gastrointest. Endosc.* 24(2):74-76; 1977.

Experience with the use of a tissue adhesive (MBR 4197) in the control of upper gastrointestinal bleeding in nine critically ill patients who were not considered candidates for emergency surgery is presented. The case reports of six patients who were treated successfully by the endoscopic application of MBR 4197 are presented. This treatment was considered to be life-saving in three patients, one who bled from ulcerated gastric cancer and two who bled from esophagitis that was associated with renal failure in one and prostatectomy in the other. These patients required 15, 16, and 6 transfusions before treatment and 2, 2, and 0 after treatment, resp. The first patient required eight treatments, while the other two required three. Two additional patients had no further bleeding from esophagitis or duodenal ulcers but died of coexisting hepatic failure, and the last patient rebled and exsanguinated from esophageal varices. This uncontrolled study in critically ill patients indicates that massive bleeding from

discrete and diffuse lesions of the upper gastrointestinal tract can be controlled by the endoscopic application of tissue adhesives.

7912 VASOACTIVE INTESTINAL PEPTIDE, THE MAJOR MEDIATOR OF THE WDHA (PANCREATIC CHOLERA) SYNDROME: VALUE OF MEASUREMENT IN DIAGNOSIS AND TREATMENT. (Eng.) Bloom, S. R. (Hammersmith Hosp., London, England). *Am. J. Dig. Dis.* 23(4):373-376; 1978.

The value of measuring vasoactive intestinal peptide (VIP) in the diagnosis and treatment of severe watery diarrhea (pancreatic cholera) syndrome is reviewed. In addition, plasma VIP concentrations in 41 healthy subjects, 39 patients with severe watery diarrhea caused by a VIP-containing tumor, 11 patients with severe diarrhea and no tumor, and in other patients are presented. Direct evidence that VIP is the cause of the Verner-Morrison syndrome and that the presence of an elevated plasma VIP level in a patient with severe diarrhea strongly suggests the possibility of a tumor was tested in the past in pigs. In this experiment, six of eight pigs receiving a 10-hr VIP infusion developed severe watery diarrhea, which stopped after the infusion was discontinued. One of the major problems of research in the area of VIP investigation has been the difficulty of accurate VIP measurement. Blood must be collected with the addition of a proteolytic enzyme inhibitor (Aprotinin, 1,000 kallikrein-inhibiting U/ml blood) and the RBC rapidly removed by centrifugation. The plasma should be deep frozen within 15 min of venipuncture and stored at -20 C. All samples must be lyophilized until their moisture content is below 0.1% and then sealed in vacuum. Normal human plasma VIP concentrations are below 20 pM. In the patients studied, it was found that values above about 60 pM were indicative of a VIP-producing tumor. The tumor in seven patients was outside the pancreas. VIP concentrations in patients with diarrhea secondary to purgative addiction, thyroid carcinoma, lung carcinoma, rectal villus adenoma, and the carcinoid syndrome were normal. VIP measurement is useful in monitoring tumor activity during treatment with streptozotocin or steroids.

7913 COMPARISON OF SUCROSE AND GLUCOSE IN THE ORAL ELECTROLYTE THERAPY OF CHOLERA AND OTHER DIARRHEAS. (Eng.) Palmer, D. L.; Koster, F. T.; Islam, A. F. M. R.; Rahman, A. S. M. M.; Sack, R. B. (Veterans Admin. Hosp., Albuquerque, NM 87108). *N. Engl. J. Med.* 297(20):1107-1110; 1977.

The effectiveness of sucrose and glucose electrolyte solutions as fluid replacement in cholera and other forms of severe diarrhea was studied in 122 patients, all of whom were over 5 yr of age. The patients all had a diarrheal volume greater than 10 ml/kg/hr during the initial interval of 4 to 6 hr of i.v. fluid rehydration. Sixty-nine patients then received a sucrose electrolyte solution (40 g/l) and 53 received a glucose electrolyte solution (20 g/l). The sole criterion of the success or failure of p.o. fluid therapy was the ability to maintain adequate hydration without return to i.v. fluids. The total success rate was 86% for the sucrose electrolyte solution and 87% for the glucose electrolyte solution. When the study was restricted to patients with cholera, the outcome with the p.o. fluids was also similar (68% success with sucrose, 78% with glucose). Most failures (13/17) occurred in patients with stool rates over 200 ml/kg/hr during the first 24 hr. Total volumes of each p.o. fluid needed per successful treatment course were essentially identical, averaging 6.0 ± 0.5 l for sucrose and 5.7 ± 0.7 l for glucose. In 10 of the 17 failures (7 sucrose and 3 glucose), the same p.o. solution was started again at a later period after i.v. rehydration. There were only two failures this time, one with each solution. The results indicate that sucrose can effectively replace glucose in a p.o. electrolyte solution for severe diarrhea in patients over 5 yr of age.

7914 ALUMINIUM HYDROXIDE IN BILE-SALT DIARRHOEA. (Eng.) Sali, A.; Murray, W. R.; MacKay, C. (Western Infirmary, Glasgow G11 6NT, Scotland). *Lancet* 2(8047):1051-1053; 1977.

The bile acid-binding property of antacids was investigated in nine patients, and the response of bile salt diarrhea to treatment with aluminum hydroxide was assessed in eight patients with severe choleraic diarrhea. In the first study, the nine peptic ulcer patients received either aluminum hydroxide (15 ml, q.i.d.) or magnesium hydroxide (10 ml, q.i.d.) p.o. for 6 days, and feces were collected over the last 2 days of treatment. The patients were then switched from one antacid to the other, and the fecal collections were repeated. Eleven age-matched controls without gastrointestinal disease received no drug. Fecal bile salt concentrations were significantly higher in patients taking aluminum hydroxide than in controls ($p<0.005$), but concentrations in patients receiving magnesium hydroxide were not significantly different from control values. In the second study, 2-day fecal collections were taken from the eight patients with diarrhea (due to ileal resection for ileal Crohn's disease or to truncal vagotomy and pyloroplasty for chronic duodenal ulceration) before and during treatment with aluminum hydroxide (40-120 ml/day), and the bile salt levels were compared with those in age- and sex-matched controls without gastrointestinal disease. Daily fecal total bile salt output in the patients before treatment was higher than that of the controls ($p<0.0005$). Bile salt output was not significantly affected by treatment with aluminum hydroxide, but analysis of total fecal bile salts does not discriminate between free and bound salts. The mean daily fecal weight decreased from 485 g to 167 g ($p<0.01$) during treatment, and five patients passed formed bowel movements. The frequency of bowel motions during treatment also fell from seven to two per day ($p<0.0005$). No patient has hypophosphatemia after 4 or more months of treatment.

7915 PARACENTESIS AND LAVAGE FOR DIAGNOSIS OF INTESTINAL GANGRENE IN NEONATAL NECROTIZING ENTEROCOLITIS. (Eng.) Kosloske, A. M.; Lilly, J. R. (Univ. New Mexico Sch. Medicine, 2211 Lomas Blvd., N.E., Albuquerque, NM 87131). *J. Pediatr. Surg.* 13(3):315-320; 1978.

Peritoneal fluid as an index of intestinal gangrene in infants with necrotizing enterocolitis (NEC) was evaluated. Twenty samples of peritoneal fluid were obtained by paracentesis or lavage from 15 infants with nonperforated NEC. A brown color in the peritoneal fluid was noted in all eight patients found to have intestinal gangrene at subsequent operation. Gram stain showed bacteria in six of these patients, and bacterial cultures were confirmatory in all but one. In 12 samples of peritoneal fluid in patients without intestinal gangrene, the fluid was straw-colored or pink, and Gram stain showed no bacteria. The decision to operate on an infant with intestinal gangrene and impending perforation may be aided by analysis of the peritoneal fluid.

7916 OUTBREAK OF NECROTISING ENTEROCOLITIS CAUSED BY Clostridium butyricum. (Eng.) Howard, F. M.; Bradley, J. M.; Flynn, D. M.; Noone, P.; Szawatkowski, M. (Royal Free Hosp., London NW3 2QG, England). *Lancet* 2(8048): 1099-1102; 1977.

Findings in a cluster of 12 cases of necrotizing enterocolitis that occurred over a 6-week period among 132 babies born in one hospital are presented. In three cases, enterocolitis was severe, requiring surgery. All babies had one or more artificial feeds. Three were breast fed, but all had artificial milk supplements. Seven patients were full-term babies without predisposing conditions, while the premature babies were well at the time of onset of enterocolitis. Only one infant had an Apgar score of less than 5 at birth, none was hypothermic, and only one had respiratory distress (mild). One baby had severe congenital heart disease, and in another, the ductus reopened following surgery for intestinal perforation. None had exchange transfusion; two had umbilical catheters inserted, while four had no nasogastric tubes. Gas-liquid chromatography indicated the presence of *Clostridium butyricum* in blood cultures from 9 of 10 infants tested, and the organism was grown in culture from 7 of these. Acute-phase stool samples from six babies with enterocolitis gave a gas-liquid chromatography pattern compatible with the presence of *C. butyricum*, whereas appropriate controls were negative. In view of previous reports of other *Clostridium* species as pathogenic agents, it is reasonable to suppose that another member of this genus, *C. butyricum*, invaded the gut wall and produced the illness in these cases.

7917 ACRODERMATITIS ENTEROPATHICA IN CHILDHOOD. (Ger.) Dick, W.; Gladtke, E. (Universitats-Kinderklinik, Josef-Stelzmann-Str. 9, 5000 Koln 41, W. Germany). *Klin. Paediatr.* 189(6):401-403; 1977.

Typical acrodermatitis enteropathica was diagnosed in a 5-month-old girl. Oxyquinoline treatment, initiated at the age of 8 months, brought about rapid disappearance of the symptoms, but the skin efflorescences recurred unfailingly whenever the medication was suspended. Impaired vision due to oxyquinoline-induced damage of the optic nerve was seen at the age of 6 yr, which prompted prednisone treatment and a prolongation of the intervals between the oxyquinoline treatments. The reduced serum zinc level was normalized by p.o. administered zinc. The cessation of the zinc substitution caused the symptoms to recur. The patient is neurologically normal under zinc substitution therapy.

7918 ACETYLCHOLINESTERASE-ACTIVITY IN RECTAL MUCOSA OF CHILDREN WITH OBSTIPATION. (Eng.) Toorman, J.; Bots, G. T. A. M.; Vio, P. M. A. (Univ. Hosp., Leiden, Netherlands). *Virchows Arch. [Pathol. Anat.]* 376(2):159-164; 1977.

Rectal suction biopsy specimens from 46 patients with obstipation were studied histochemically for acetylcholinesterase activity to determine whether this measurement could be used in the differential diagnosis of Hirschsprung's disease. In four cases, abundant and coarse acetylcholinesterase-positive nerve fibers were present in the lamina propria. The diagnosis of Hirschsprung's disease was supported by the clinical course in these patients only. Thirty-two patients with no acetylcholinesterase-positive nerve fibers had clinical features that did not support the diagnosis of Hirschsprung's disease (i.e., ganglion cells present, onset of obstipation after age 1 yr, or spontaneous recovery), as did 10 patients with local aggregations of fine acetylcholinesterase-positive nerve fibers in the lamina propria. The determination of acetylcholinesterase activity is an easy and safe procedure for the diagnosis of Hirschsprung's disease.

7919 THE EFFECTIVENESS OF ANTIBIOTIC TREATMENT FOR Salmonella ENTERITIS AND Salmonella EXCRETORS. (Ger.) Kindler, U.; Schoppe, W. D.; Briese, W. (1. Medizinische Klinik A der Universitat, Moorenstr. 5, 4000 Dusseldorf, W. Germany). *Dtsch. Med. Wochenschr.* 102(47):1720-1723; 1977.

The effect of single antibiotics (tetracycline, chloramphenicol, ampicillin, penicillin, cotrimoxazol) and their combinations (given in the usual dosages) on the duration of *Salmonella* excretion was studied in 122 patients with *Salmonella* enteritis and in 79 asymptomatic *Salmonella* excretors. The average duration of *Salmonella* excretion was 20.4 days in the 97 antibiotic-treated patients with *Salmonella* enteritis versus 15 days in 15 control patients who received symptomatic treatment only. The *Salmonella* excretion ceased in 45/50 asymptomatic excretors treated with antibiotics and in 26/29 untreated control excretors during the first week. The findings indicate that antibiotic treatment does not shorten considerably the duration of *Salmonella* excretion. Therefore, the antibiotic treatment of *Salmonella* infection

(other than typhoid and paratyphoid) should be limited to systemic forms, while patients with complication-free *Salmonella* enteritis as well as excretors should be treated by purgation.

7920 CLINICAL RECOVERY OWING TO TARGET PARIETAL CELL FAILURE IN A PATIENT WITH ZOLLINGER-ELLISON SYNDROME. (Eng.) Wiersinga, W. M.; Tytgat, G. N. (Univ. Hosp., Wilhelmina Gasthuis, Amsterdam, Netherlands). *Gastroenterology* 73 (6):1413-1416; 1977.

The case of a patient with the Zollinger-Ellison syndrome, in whom spontaneous disappearance of gastric hypersecretion and peptic ulcer disease occurred subsequent to an intercurrent illness causing acute nonspecific inflammation of the gastric mucosal lining, is presented. The patient, a 29-yr-old man, had a 3-yr history of recurrent peptic ulcer, occasional vomiting, and diarrhea. Upper gastrointestinal series and gastroduodenoscopy demonstrated no active ulcer formation or deformities in the duodenal bulb, and gastric biopsies were normal. The fasting plasma gastrin values were all elevated. There was no increase in plasma gastrin after a protein-rich test meal, but the i.v. injection of secretin and of ionized calcium resulted in a dramatic increase of plasma gastrin with a peak of 2,325 ng/l and 2,330 ng/l, resp. Before investigations to localize a pancreatic tumor could be undertaken, the patient became acutely ill with general and severe malaise, nausea and vomiting, and fever. He received only clorazepate for nervousness during this time. He gradually recovered in about 1 week, during which time no stools were produced, which was followed by a full resolution of his previous symptoms. Prior to the intercurrent illness, his basal gastric acid secretion rate was 23.52 mmol/hr, and maximal acid output after pentagastrin stimulation was 56.42 mmol/hr. After the illness, the basal secretion dropped to 0, and the maximal acid output was reduced to 1.20 and 0.67 mol/hr, resp. His basal gastrin level remained high, as did the secretin-stimulated gastrin level. However, the meal-stimulated gastrin release was reduced after the illness. Three months after the illness, the gastric mucosa showed severe inflammation with lymphocytes, plasma cells, and polymorphonuclear leukocytes throughout the gastric mucosa with inflammatory permeation and destruction of the glandular layer. Eight months after the illness, evidence of gastritis was still present, but the severity of the inflammation was diminished. The dramatic clinical improvement after subsiding of the intercurrent illness was obviously linked to pronounced failure of the parietal cell mass for acid secretion and not to infarction of the gastrinoma, because gastrin hypersecretion was unchanged.

7921 MAGNESIUM SUPPLEMENTATION IN PROTEIN-CALORIE MALNUTRITION. (Eng.) Nichols, B. L.; Alvarado, J.; Hazlewood, C. F.; Viteri, F. (Baylor Coll. Medicine, Houston, TX). *Am. J. Clin. Nutr.* 31(1):176-188; 1978.

7922 SERUM RIBONUCLEASE ACTIVITY IN PATIENTS DURING PARENTERAL NUTRITION, CHRONIC HEMODIALYSIS AND ACUTE PANCREATITIS. (Eng.) Sommer, H.; Gang, V.; Heidland, A. (Medizinische Universitatsklinik, Josef-Schneider-Str. 2, D-8700 Wurzburg, W. Germany). *Klin. Wochenschr.* 55:1019-1020; 1977.

7923 SMALL SPHERICAL VIRUSES IN FAECES FROM GASTROENTERITIS PATIENTS. (Eng.) Kjeldsberg, E. (Natl. Inst. Public Health, Postuttak, Oslo 1, Norway). *Acta Pathol. Microbiol. Scand.* [B] 85(5):351-354; 1977.

7924 CARCINOMA OF THE MAJOR AND MINOR SALIVARY GLANDS: ANALYSIS OF TREATMENT RESULTS AND SITES AND CAUSES OF FAILURES. (Eng.) Fu, K. K.; Leibel, S. A.; Levine, M. L.; Friedlander, L. M.; Boles, R.; Phillips, T. L. (Univ. California, Div. Radiation Oncology, 330 Moffitt, San Francisco, CA 94143). *Cancer* 40(6):2882-2890; 1977.

7925 INTESTINAL DAMAGE IN ROTAVIRUS AND ADENOVIRUS GASTROENTERITIS ASSESSED BY D-XYLOSE MALABSORPTION. (Eng.) Mavromichalis, J.; Evans, N.; McNeish, A. S.; Bryden, A. S.; Davies, H. A.; Flewett, T. H. (Univ. Thessaloniki, Thessaloniki, Greece). *Arch. Dis. Child.* 52(7):589-591; 1977.

7926 MALIGNANT MYOEPITHELIOMA OF THE PAROTID GLAND. (Eng.) Crissman, J. D.; Wirman, J. A.; Harris, A. (Coll. Medicine, Univ. Cincinnati, 231 Bethesda, Cincinnati, OH 45267). *Cancer* 40(6): 3042-3049; 1977.

7927 SUPERIOR VENA CAVA SYNDROME SECONDARY TO Candida THROMBOPHLEBITIS COMPLICATING PARENTERAL ALIMENTATION. (Eng.) Wiley, E. L.; Hutchins, G. M. (Johns Hopkins Hosp., Baltimore, MD 21205). *J. Pediatr.* 91(6):977-979; 1977.

7928 INTESTINAL PROTEIN LOSS IN PROTEIN-CALORIC MALNUTRITION. (Eng.) Crespo, R.; Schmidt, B. J.; Carvalho, N.; Costa, C. D. (Faculdade de Medicina de Sorocaba, PUC, Sao Paulo, Brazil). *Arq. Gastroenterol.* 14(3):167-174; 1977.

7929 PERITONEAL DRAINAGE UNDER LOCAL ANESTHESIA FOR PERFORATIONS FROM NECROTIZING ENTEROCOLITIS. (Eng.) Ein, S. H.; Marshall, D. G.; Girvan, D. (Hosp. Sick Children, Toronto, Ontario, Canada). *J. Pediatr. Surg.* 12(6):963-967; 1977.

7930 ZOLLINGER-ELLISON SYNDROME CAUSED BY A DUODENAL WALL TUMOUR. (Eng.) Kune, G. A.; Judson, R.; Sinclair, R. (Repatriation General Hosp., Heidelberg, Victoria 3077, Australia). *Med. J. Aust.* 2(11):359-361; 1977.

GENERAL

7931 DYNAMIC FLOW STUDY IN WARTHIN'S TUMOR OF PAROTID GLAND. (Eng.) Sagar, V. V.; Piccone, J. M.; Meckelnburg, R. L. (Veterans Admin. Hosp., 1601 Kirkwood Highway, Wilmington, DE 19805). *Clin. Nucl. Med.* 2(11):404-405; 1977.

7932 SUBMANDIBULAR GLAND TUMORS. (Eng.) Hanna, D. C.; Clairmont, A. A. (Western Pennsylvania Hosp., Pittsburgh, PA). *Plast. Reconstr. Surg.* 61(2):198-203; 1978.

7933 RELATION OF HUMAN GASTROINTESTINAL MUCUS TO DISEASE STATES. (Eng.) Schrager, J.; Oates, M. D. G. (Royal Infirmary, Wigan, Lancashire, England). *Br. Med. Bull.* 34(1):79-82; 1978.

7934 GASTROINTESTINAL CANCER: EPIDEMIOLOGY AND EXPERIMENTAL STUDIES. (Eng.) Jansson, B.; Jacobs, M. M.; Griffin, A. C. (M. D. Anderson Hosp. and Tumor Inst., Houston, TX 77030). *Adv. Exp. Med. Biol.* 91:305-322; 1977.

7935 DRUG-INDUCED GASTROINTESTINAL DISEASE. (Eng.) Hyson, E. A.; Burrell, M.; Toffler, R. (Yale Univ. Sch. Medicine, New Haven, CT). *Gastrointest. Radiol.* 2(3):183-212; 1977.

7936 RESPONSES OF THE SPLANCHNIC CIRCULATION TO ISCHAEMIA. (Eng.) Marston, A. (Middlesex Hosp., London, England). *J. Clin. Pathol.* 30(11, Suppl.):59-67; 1977.

7937 ELECTROLYTE ECONOMY AND ITS HORMONAL REGULATION IN CONGENITAL CHLORIDE DIARRHEA. (Eng.) Holmberg, C. (Children's Hosp., Univ. Helsinki, SF-00290 Helsinki 29, Finland). *Pediatr. Res.* 12(2):82-86; 1978.

7938 AGE DISTRIBUTION OF ANTIBODY TO REOVIRUS-LIKE AGENT IN CHILDREN IN TAIWAN. (Eng.) Echeverria, P.; Blacklow, N. R.; Ho, M. T.; Cukor, G.; Beasley, R. P. (U.S. Naval Medical Res. Unit No. 2, Box 14, APO San Francisco, CA 96263). *J. Pediatr.* 91(6):960-962; 1977.

See also, 7272, 7303, 7369, 7450, 7465, 7468, 7493, 7495, 7595, 7603, 7608, 7613, 7618, 7625, 7634, 7639, 7641, 7643, 7668, 7671, 7676, 7721, 7727, 7740, 7749, 7750, 7798, 7852, 7853, 7858, 7882, 7896.

GENERAL

Parasitology

7939 Strongyloides stercoralis COLITIS: FINDINGS IN FOUR CASES. (Eng.) Drasin, G. F.; Moss, J. P.; Cheng, S. H. (Jewish Hosp., 217 Chestnut St., Louisville, KY 40202). *Radiology* 126(3):619-621; 1978.

The case of a patient with extensive biopsy-proved *Strongyloides stercoralis* colitis is presented, and the radiological findings in this patient and in three others are discussed. The patient was a 61-yr-old man who presented with wheezing and coughing, followed 1 yr later by diarrhea. The first barium enema examination was normal, but another examination carried out after he developed bloody stools showed severe ulcerating colitis with both small and large ulcers, from the cecum to the rectum. Nodularity and a loss of the haustral pattern were noted. Small bowel examination demonstrated typical changes, with fluid, submucosal edema, absence of a mucosal pattern, and slow transit time. Stool specimens for ova and parasites contained larvae of *S. stercoralis*. Ova were present within the submucosa and lamina propria. All three of the other cases were found to have loss of haustration, but ulceration was present in only two. Narrowing was present in the mid-descending colon and distal transverse colon, and stenosis or spasm occurred in the right colon of another patient. *S. stercoralis* infection was not detected until postmortem examination in one patient. Barium enema examinations can help in evaluating the nature and clinical progress of this disease.

7940 BISAMIDINES OF 2,6-DIAMINOANTHRAQUINONE AS ANTIAMEBIC AGENTS. (Eng.) Fabio, P. F.; Fields, T. L.; Lin, Y-i.; Burden, E. J.; Carvajal, S.; Murdock, K. C.; Lang, S. A., Jr. (Lederle Lab., American Cyanamid Co., Pearl River, NY 10965). *J. Med. Chem.* 21(3):273-276; 1978.

7941 ANAEROBIC LIVER ABSCESS AND INTRAHEPATIC METASTASES: A CASE REPORT AND REVIEW OF THE LITERATURE. (Eng.) Trump, D. L.; Fahnestock, R.; Cloutier, C. T.; Dickman, M. D. (Johns Hopkins Hosp., 601 N. Broadway, Baltimore, MD 21205). *Cancer* 41(2):682-686; 1978.

7942 HEPATIC SCHISTOSOMIASIS: A CASE WITH INTRAHEPATIC SHUNTING AND EXTRAHEPATIC PORTAL VEIN OCCLUSION. (Eng.) Sniderman, K. W.; Sos, T. A. (New York Hosp.-Cornell Medical Center, 525 E. 68th St., New York, NY 10021). *Am. J. Roentgenol.* 130(3):565-567; 1978.

7943 ENDOSCOPIC RETROGRADE CHOLANGIOGRAPHY IN HEPATIC HYDATID DISEASE. (Eng.) Cottone, M.; Amuso, M.; Cotton, P. B. (Ospedale V. Cervello, Palermo, Sicily, Italy). *Br. J. Surg.* 65(2):107-108; 1978.

7944 ON ALLOWING FOR DIAGNOSTIC IMPERFECTIONS IN ASSESSING EFFECTIVENESS OF TREATMENT FOR SCHISTOSOMIASIS. (Eng.) Goddard, M. J. (London Sch. Hygiene and Tropical Medicine, London WC1, England). *Int. J. Epidemiol.* 6(4):381-389; 1977.

7945 PILOT STUDY WITH TINIDAZOLE SINGLE DOSE IN THE TREATMENT OF GIARDIASIS. (Eng.) Sampaio Silva, M. L.; Coutinho da Costa, F. M.; Peixoto, M. M.; Bastos, M. A.; Queiros, M. J.; Calheiros, J. M. (Instituto Nacional de Saude [INSA], Oporto, Portugal). *Acta Ther.* 3(4):303-308; 1977.

7946 TREATMENT OF GIARDIASIS IN PAEDIATRICS WITH A SINGLE DOSE OF TINIDAZOLE. (Eng.) Coutinho da Costa, F. M.; Sampaio Silva, M. L.; Peixoto, M. M.; Bastos, M. A. (Inspeccao de Saude, Coimbra, Portugal). *Acta Ther.* 3(4):309-312; 1977.

7947 CHEMOTHERAPY OF HUMAN INTESTINAL PARASITIC DISEASES. (Eng.) Botero R., D. (Sch. Medicine, Univ. Antioquia, Medellin, Colombia). *Ann. Rev. Pharm. Toxicol.* 18:1-15; 1978.

7948 HEPATIC AND RENAL AMYLOIDOSIS IN ASSOCIATION WITH SCHISTOSOMIASIS: A CASE REPORT. (Eng.) Gold, C. H. (Beilinson Medical Center, Petah Tiqva, Israel). *S. Afr. Med. J.* 53(17):681-682; 1978.

7949 RESOLUTION OF AMOEBIC LIVER ABSCESS STUDIED BY SERIAL LIVER SCANNING. (Eng.) Habibullah, C. M.; Quraishi, M. A.; Rao, S. R.; Chandra, V.; Murthy, K. J. R. (Osmania Medical Coll., Hyderabad, India). *J. Indian Med. Assoc.* 69(11):250-252; 1977.

7950 IN VIVO EFFECTS OF MEBENDAZOLE AND LEVAMISOLE IN THE TREATMENT OF TRICHURIASIS AND ASCARIASIS. (Eng.) Wagner, E. D.; Rexinger, D. D. (Dept. Microbiology, Loma Linda Univ., Loma Linda, CA 92354). *Am. J. Trop. Med. Hyg.* 27(1):203-205; 1978.

7951 THE PREVALENCE OF HOOKWORM AND OF S. haematobium IN RURAL ZAMBIA. (Eng.) Wenlock, R. W. (Natl. Food and Nutrition Commission, Lusaka, Zambia). *Trop. Geogr. Med.* 29(9):415-421; 1977.

7952 OPERATIVE TREATMENT OF ALVEOLAR ECHINOCOCCOSIS OF THE LIVER. (Eng.) Kasai, Y.; Sasaki, E.; Koshino, I.; Kawanishi, N.; Kumagai, M. (Hokkaido Univ. Sch. Medicine, Sapporo, Japan). *Jpn. J. Surg.* 8(1):28-33; 1978.

7953 AMOEBIASIS IN PREGNANCY AND THE PUERPERIUM. (Eng.) Armon, P. J. (Kilimanjaro Christian Medical Center, Moshi, Tanzania). *Br. J. Obstet. Gynaecol.* 85(4):264-269; 1978.

7954 AMOEBIASIS. (Eng.) Juniper, K. (Southern Illinois Univ. Sch. Medicine, Springfield, IL). *Clin. Gastroenterol.* 7(1):3-29; 1978.

7955 GIARDIASIS, ISOSPORIASIS AND BALANTIDIASIS. (Eng.) Knight, R. (Liverpool Sch. Tropical Medicine, Liverpool, England). *Clin. Gastroenterol.* 7(1):31-47; 1978.

7956 SCHISTOSOMIASIS MANSONI. (Eng.) Prata, A. (Faculdade de Ciencias da Saude, Univ. Brasilia, Brasilia, Brazil). *Clin. Gastroenterol.* 7(1):49-75; 1978.

7957 SCHISTOSOMIASIS JAPONICA. (Eng.) Warren, K. S. (Dept. Health Sciences, Rockefeller Foundation, New York, NY). *Clin. Gastroenterol.* 7(1):77-85; 1978.

7958 DIGENETIC TREMATODES. (Eng.) Seah, S. K. K. (Dept. Medicine, McGill Univ., Montreal, Quebec, Canada). *Clin. Gastroenterol.* 7(1):87-104; 1978.

7959 CESTODES. (Eng.) Jones, T. C. (Cornell Univ. Medical Coll., New York, NY). *Clin. Gastroenterol.* 7(1):105-128; 1978.

7960 HOOKWORM. (Eng.) Banwell, J. G.; Schad, G. A. (Univ. Kentucky Medical Center, Lexington, KY). *Clin. Gastroenterol.* 7(1):129-156; 1978.

See also, 7275, 7396, 7455, 7459, 7460, 7461, 7462, 7464, 7503, 7736, 7805.

7961 ANGIOGRAPHY OF COLONIC CROHN'S DISEASE: THE ZONING SIGN REVISITED. (Eng.) Herlinger, H. (St. James' Univ. Hosp., Leeds, England). *Gastrointest. Radiol.* 2(4):397-400; 1978.

The zoning sign in distinguishing colonic Crohn's disease from ulcerative colitis is described, and the presence or absence of this sign was studied in 40 angiograms. This sign was demonstrated in 50% of the 40 angiograms carried out in patients with colonic Crohn's disease, including six of nine cases of cecal Crohn's disease. When positive, the colon shows a double layer of vascularity, an intensely vascularized inner core (zone A) likely to represent the mucosa/submucosa and an outer cylinder of decreased vascularity (zone B). In 4 of the 40 angiograms, a thin, somewhat interrupted outer layer of vascularity was identified. This was clearly separated from zone A by the seemingly avascular zone B. It can be assumed that this outermost layer represents that of subserosal hyperemia, and it is proposed to refer to it as zone C.

7962 CARCINOEMBRYONIC ANTIGEN (CEA) SERUM LEVELS IN PATIENTS WITH CROHN'S DISEASE IN REGARD TO LOCALIZATION, DURATION AND ACTIVITY OF THE DISEASE. (Ger.) Kruis, W.; Pfaff, G.; Lamerz, R.; Eisenburg, J. (Klinikum Grosshadern der Univ. Munchen, Marchioninistrasse 15, 8 Munich 70, W. Germany). *Fortschr. Med.* 95(47/48):2795-2798; 1977.

The serum levels of carcinoembryonic antigen (CEA) were measured repeatedly in 24 patients with Crohn's disease over a period of up to 35 months. Elevated CEA levels (>3 ng/ml; average, 4.5 ng/ml; maximum, 9 ng/ml) were found in 13 patients. The length of the disease was ≤5 yr in six patients and >5 yr in seven. Both the Crohn's Disease Activity Index (CDAI) and the CEA level were very high in 4 tests, and both parameters were simultaneously low in 10. The incidences of increased CEA levels were 1/3 in patients with Crohn's disease of the ileum, 2/5 patients with Crohn's disease of the colon, and 10/16 patients with Crohn's disease of the ileum and colon. Recurrences were accompanied by increased CEA level in four tests, no increase was seen during recurrence in two tests, and elevation of the CEA level without recurrence was seen in nine tests. The findings show a positive correlation between the extent of the lesion and the CEA serum level but no correlation between the duration of the disease and the CEA level. Good correlation was seen in a few cases between CDAI and the CEA level. It is concluded that the serum CEA level has no diagnostic or prognostic value in Crohn's disease.

7963 LEUCOCYTE ASCORBIC ACID IN CROHN'S DISEASE. (Eng.) Hughes, R. G.; Williams, N. (Bristol Royal Infirmary, Bristol BS2 8HW, England). *Digestion* 17(3):272-274; 1978.

The effects of surgery, diet, and drugs on ascorbic acid status were investigated in 19 patients with Crohn's disease, as spontaneous fistula formation and poor wound healing in this disease may be related to inadequate vitamin C and poor collagen metabolism. The mean leukocyte ascorbic acid (LAA) level in the patients (160.7 ± 19.75 nmol/10^8 WBC) was significantly lower than that in normal age- and sex-matched controls (232.7 ± 40.2 nmol/10^8 WBC, $p<0.01$). There was a positive correlation between dietary ascorbic acid intake and LAA levels ($r=0.302$). No significant difference in LAA levels between those patients who had undergone surgery and those who had not was found. When drug history was reviewed, LAA levels did not differ significantly from the rest of the group. The low LAA levels in patients with Crohn's disease appear to be due to the disease rather than to the effect of drug or operative treatment. Prescribing supplementary ascorbic acid is an appropriate step in correcting this deficiency.

7964 HODGKIN'S DISEASE COMPLICATING CROHN'S COLITIS. (Eng.) Codling, B. W.; Keighley, M. R. B.; Slaney, G. (Queen Elizabeth Hosp., Birmingham, England). *Surgery* 82(5):625-628; 1977.

A case of Hodgkin's disease involving an area of Crohn's colitis in a 35-yr-old patient with a 20-yr history of inflammatory bowel disease is described. The patient presented with weight loss, abdominal pain, bloody diarrhea, and night sweats. The mucosa of the terminal ileum and colon showed extensive fissuring, a cobblestone pattern, and transmural thickening. The terminal 18 cm of resected colon was diffusely infiltrated by a firm, white tumor tissue. The attached lymph nodes were enlarged with a uniform, pale, cut surface. Parrafin sections of the resected tissue showed prominent lymphoid tissue with a diffuse increase in eosinophils and fibrous tissue. The mucosa of the small intestine also showed large numbers of Paneth cells and lymphocytes, but there was no evidence of small intestinal involvement by Crohn's disease or Hodgkin's lymphoma. The proximal colon showed features typical of Crohn's disease, but there was no evidence of tumor involvement. The wall of the distal colon showed extensive mucosal ulceration, an acute and chronic inflammatory cell reaction, and diffuse tumor infiltration (histiocytes, plasma cells, lymphocytes, a few eosinophils), and the lymph nodes attached to the specimen showed replacement by Hodgkin's tissue similar to that in the main tumor mass. The diagnosis was Hodgkin's disease of the mixed cellularity type. After radiotherapy, quadruple chemotherapy, and an additional laparotomy for an abdominal abscess, the patient has gained weight, has no evidence of tumor recurrence, and is well despite hepatic in-

volvement from the original tumor. The simultaneous occurrence of these two entities may be coincidental, or there may be a true association between Crohn's disease and lymphoma. If so, it is likely that altered immune mechanisms play a role in the pathogenesis of the condition.

7965 A FAMILIAL PATTERN IN INFLAMMATORY DISEASE OF THE BOWEL (CROHN'S DISEASE AND ULCERATIVE COLITIS). (Eng.) Dassel, P. M. (Ferguson-Droste-Ferguson Hosp., 72 Sheldon Blvd. S.E., Grand Rapids, MI 49502). *Dis. Colon Rectum* 20(8):669-671; 1977.

Twelve families in which two or more members had inflammatory bowel disease are reported. The families were of Caucasian, non-Jewish descent. The greatest incidence of inflammatory bowel disease occurred in families 1 and 2, in which three sisters and a male cousin in a family of 10, and two brothers, one son, and two daughters in a family of 13, resp., were affected by Crohn's disease. Another family was unusual in that the husband and wife had Crohn's disease and ulcerative colitis, resp., and one of two children had ulcerative colitis. There were a total of 23 cases of Crohn's disease and 7 of ulcerative colitis. The most common association in familial bowel diseases was in siblings, and then in parent-child relationships.

7966 THERAPY TRIAL OF INTAL (DISODIUM CHROMOGLYCATE) IN THE TREATMENT OF CROHN'S DISEASE. (Pol.) Szmigiel, Z.; Pikor-Daraz, I.; Szczepaniak, A. (No affiliation given). *Przegl. Lek.* 34(5):513; 1977.

7967 PERICARDITIS ASSOCIATED WITH GRANULOMATOUS COLITIS. (Eng.) Mihas, A. A.; Dasher, C. A. (Div. Gastroenterology, Univ. Alabama in Birmingham, University Station, Birmingham, AL 35294). *Am. J. Gastroenterol.* 68(5):494-497; 1977.

7968 THE FEATURES OF GRANULOMATOUS COLITIS IN DOUBLE CONTRAST RADIOGRAPHY. (Eng.) Pringot, J.; Goncette, L.; Van Heuverzwyn, R.; Bodart, P. (Clinique Universitaire Saint-Luc, Universite Catholique de Louvain, Avenue Hippocrate 10, 1200 Bruxelles, Belgium). *J. Belg. Radiol.* 60(1):25-35; 1977.

7969 REGIONAL ENTERITIS IN CHILDREN: SMALL BOWEL DISEASE WITH NORMAL TERMINAL ILEUM. (Eng.) Kirks, D. R.; Currarino, G. (Children's Medical Center, 1935 Amelia St., Dallas, TX 75235). *Pediatr. Radiol.* 7(1):10-14; 1978.

7970 MULTIPLE HEPATIC ABSCESSES COMPLICATING REGIONAL ENTERITIS: THE IMPORTANCE OF PRIOR SURGERY OR CORTICOSTEROID THERAPY. (Eng.) Watts, H. D. (Dept. Medicine, Univ. California, A555 New Clinics Building, San Francisco, CA 94143). *Am. J. Dig. Dis.* 23(5, Suppl.):41s-47s; 1978.

7971 THE METABOLIC CONSEQUENCES OF SURGERY IN CROHN'S DISEASE. (Eng.) Filipsson, S.; Hulten, L.; Lindstedt, G.; Rehnberg, O. (Sahlgren's Hosp., S-413 45 Goteborg, Sweden). *Scand. J. Gastroenterol.* 13(4):471-479; 1978.

7972 THE VALUE OF ENDOSCOPIC BIOPSIES IN THE DIAGNOSIS OF CROHN'S DISEASE. (Eng.) Geboes, K.; Desmet, V. J.; De Wolf-Peeters, C.; Vantrappen, G. (Academisch Ziekenhuis Sint Rafael, B-3000 Leuven, Belgium). *Am. J. Proctol.* 29(3): 21-27; 1978.

7973 SAGITTAL SINUS THROMBOSIS AS A COMPLICATION OF REGIONAL ENTERITIS. (Eng.) Sigsbee, B.; Rottenberg, D. A. (Memorial Sloan-Kettering Cancer Center, New York, NY). *Ann. Neurol.* 3(5):450-452; 1978.

See also, 7495, 7625, 7722, 7723, 7724, 7728, 7733, 7735.

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